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# *EASeR Project*

## *SOP INT OUTLINE –*

### *Final Version Tested*



## Project Description

The EASeR project focuses on a specific area of search and rescue (SAR) assessment called “barrier effect” during emergency interventions in response to natural disasters, especially earthquakes. The term “barrier effect”, used by the Fire Department of Pisa (IT), refers to obstacles resulting from a wide range of environmental factors such as: heavy snow, traffic resulting from damaged road systems through narrow/limited escape routes, road interruptions, non-coherent management of information flow (dissemination of false/fake information, correct information not taken into account, missing basic information). Such factors can severely hamper the general assessment in SAR as demonstrated by the personal experience of the USAR team of the Fire Dep. of Pisa in both national and international missions. EASeR shall provide a practical strategy to carry out the assessment in SAR more efficiently, with a positive cascade effect on the general performance of all subsequent operations.

The strategy shall consist in:

- i) analysing the state of the art
- ii) providing operational tools as procedures to be validated in IT and Recommendations to be disseminated at an international level
- iii) identifying new technologies that can be applied innovatively in support of the assessment (software, drones)
- iv) drafting procedures on the deployment of helicopters belonging to other corps, whenever possible.

Procedures and innovative technologies shall be tested in a small-scale exercise where assessment teams from IT, CZ and PL will face the “barrier effect”. The Fire Department of Pisa coordinates the consortium formed by:

- i) FRB MSR (public body, CZ)
- ii) CNBOP-PIB (research institute, PL)
- iii) Timesis (SME, IT).

The involvement of national authorities in civil protection and Fire Department emergency units shall make the project findings sustainable on the longer term (with direct impact in IT, CZ, PL). Additionally, three final conferences targeting end-users shall disseminate the EASeR findings.

## Key Activities – International Survey

The method used to analyse the state of the art, as agreed, is a questionnaire (on-line survey) built up to involve international experts whose knowledge and experience contributed to define “the barrier effect” more precisely and to detect previously unnoticed gaps. This allowed the project team to collect data about the “barrier effect” from the following countries:

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

Based on the experience of Italian, Czech and Polish rescuers and of outcomes from the surveys delivered by international Search and Rescue Associations, the debate about the form of the SOP’s index/content started.

## End Products

The project’s three end products shall be:

1. Italian Standard Operating Procedures
2. International Standard Operating Procedures - Outline
3. Recommendations - for different levels of rescue mission and players.

Each end product shall reach the recipients at various levels of rescue operations management, so that by serving one purpose, all of them shall maximize the effectiveness of rescue operations by joining the forces of all possible actors not only as to on-site rescue activities.

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## 0. Introduction

### 0.1. The Barrier Effects

Starting from the results of the survey conducted within USAR teams with national and international experience, some issues linked to barrier were identified.

Such results were analysed and consolidated by the EASeR Project team to draft a list of all possible barrier effects for understanding what SOPs shall be needed to solve or if not possible to handle them and at least mitigate them.

The schedule below describes the list of the consolidated issues together with some examples allowing to understand their meaning.

<b>ISSUES LINKED TO BARRIER EFFECT</b>	<b>EXAMPLES</b>
1. ACCESS TO WORKSITES	Difficulties to access worksites due to: <ul style="list-style-type: none"><li>- evacuation of the residents from the affected area</li><li>- damaged infrastructures</li><li>- high environmental risk</li><li>- severe weather condition</li><li>- evacuees' lack of awareness about how to behave</li><li>- assessment team's lack of knowledge about the area</li><li>- safety and security issues.</li></ul>
2. PERFORMANCE, KNOWLEDGE, SKILLS & TRAINING OF THE ASSESSMENT TEAMS	All the items linked to the staff of the assessment team, like: <ul style="list-style-type: none"><li>- issues needing improvement through training (necessary experience, cultural issues, lack of general guidelines on how to manage appropriate area assessment</li></ul>



	<p>during national/international emergencies, buildings' marking, etc..)</p> <ul style="list-style-type: none"> <li>- team's ideal skills (related to its composition and dimension and how to connect it with emergency dimension)</li> <li>- training in field orientation in different weather conditions and assessment work by day and night</li> <li>- working with specific GIS tools to quickly find the references in a fairly unknown affected area</li> <li>- capacities and skills to analyse and process Sat photos, Geographical Information Data, UAV Mapping</li> <li>- abilities and skills to represent the current situation in maps (Standard Symbolology) and ability to share key information in formal and informal meetings).</li> </ul>
<p>3. INTERACTION WITH THE AFFECTED POPULATION</p>	<p>Possible difficulties can be:</p> <ul style="list-style-type: none"> <li>- language barrier</li> <li>- people interviewed in the affected area or in its close proximity are directly or indirectly affected by the consequences of the incident</li> <li>- level of preparation of the affected population</li> <li>- gathering of relevant information.</li> </ul>
<p>4. TIME PRESSURE</p>	<p>Possible difficulties may be:</p> <ul style="list-style-type: none"> <li>- high expectations of the affected population</li> <li>- special requests from affected population</li> <li>- high pressure from supervisors on "finding someone"</li> <li>- difficulties to manage the peak of demands to the assessment teams (at all levels and hierarchical order).</li> </ul>

<p>5. COMMUNICATIONS &amp; IT</p>	<p>Possible difficulties may be:</p> <ul style="list-style-type: none"> <li>- non-coherent management of information flow</li> <li>- lack of reliable communication means and user friendly platforms</li> <li>- damaged or congested communication infrastructures</li> <li>- overloaded communication channels due to the high number of services working on site without using dedicated channels on different levels of intervention</li> <li>- lack of common language between all the players.</li> </ul>
<p>6. INCIDENT AND WHOLE EMERGENCY MANAGEMENT</p>	<p>Possible items that are included into this issue:</p> <ul style="list-style-type: none"> <li>- experience and training needed for the Incident Managers</li> <li>- necessity to have SOP specific on management</li> <li>- information on how to asses the need for international help</li> <li>- need to raise the awareness of local authorities/first responders</li> <li>- need to clarify competences and management organizations of all the entities involved in an emergency and how to manage crisis coordination</li> <li>- clear identification of competences for on-site commander to require personal and material assistance.</li> </ul>
<p>7. NEW TECHNOLOGIES DEPENDENCY AND SUPPORT</p>	<p>All possible aspects linked to a beneficial use of new technologies like drones and mapping:</p> <ul style="list-style-type: none"> <li>- lack of new technologies</li> <li>- lack of detailed satellite maps of the area</li> <li>- availability of updated maps and distribution of common maps for all players (When, How, Verification...)</li> </ul>

	<ul style="list-style-type: none"> <li>- data quality (verification, last update,...)</li> <li>- availability of new technologies that cannot be used</li> <li>- extended waiting time for satellite maps or available, yet unreachable satellite maps</li> <li>- lack of interoperable software tools.</li> </ul>
8. MEDIA MANAGEMENT	<p>Possible difficulties can be:</p> <ul style="list-style-type: none"> <li>- different sources of information, releasing contradictory situation overview</li> <li>- problems with collection of media information and monitoring (very chaotic and useless media information)</li> <li>- release of deliberately false information</li> <li>- need for SOP for cooperation with the media in case of incident</li> <li>- social media monitoring.</li> </ul>
9. USE OF AIRCRAFTS/HELICOPTERS AND GENERALLY AIR, LAND AND WATER VEHICLES	<p>Items needed to be clarified for a relevant and adequate use of vehicles, most of all aircraft and helicopters as follows:</p> <ul style="list-style-type: none"> <li>- procedures for USAR assessment teams and helicopters teams</li> <li>- detailed training and knowledge of helicopters' use and their potential.</li> </ul>
10. ACTIVITIES OUTSOURCING	<p>This issue is linked to all possible activities, modalities and difficulties that can be encountered in using an outsourcing tool or resource during assessment.</p>

## 0.2. The Involved Players

During the analysis of the possible issues linked to a barrier effect during search and rescue assessment activities, the Project Team also focused on the players interacting with USAR assessment teams. The aim was not only to identify all possible players involved but also to understand their role during assessment activities and how they could help when facing barrier effects.

The results of this analysis identifying the following players interacting with USAR Assessment Teams:

- the Operations Centres coordinating and managing major emergencies on a central level
- Local Authorities (Mayor and other local entities of different levels)
- First Responders (Fire Fighters Local Teams and Local Volunteers of Civil Protection).

The National and International USAR teams are the ones conducting assessment activities and can be directly involved in barrier effects.

Each actor was assigned a specific section as follows where describing itself and its roles and tasks during a major emergency. A specific section shall also be dedicated to barrier effects linked to the activities of such actor.

It is also important to say that the barrier effect issues are linked to temporal phases before and after a major emergency, that is to say:

- Preparedness (it is the period between disaster responses). In this phase, it is possible to conduct training and exercises, review lessons learnt from previous experiences, update standard operating procedures (SOPs), and plan future responses.
- Activation & Mobilization (the activation phase takes place immediately after a major emergency with the first activities from the emergency system and then with moving resources during mobilization)
- Deployment (the phase when resources start moving towards the emergency site)
- Operations (the phase when teams start working in the emergency site, according to SOPs, the assessment activities).

## 1. OPERATIONS CENTRE

By “Operations Centre”, it is intended the National Central Facility in charge of coordinating, on a Central level, rescue forces during emergency interventions in response to natural disasters, especially earthquakes.

This paragraph includes the following:

- a description of the Operations Centre, its position within the organization and its hierarchy as to the rest of the organization
- an illustration of the organization, more particularly the Operations Centre offices, their responsibilities and internal branch
- a description of the personnel of this stakeholder (personnel's knowledge, skills and training) and their responsibilities identified in each area
- the alarm levels linked to an emergency and the conditions the Operations Centre is called to act upon directly
- the analysis of the Operations Centre 's resources and how they can be used in order to face barrier effect issues.

More particularly, it shall be useful to describe how the Operations Centre decides which teams are going to conduct the assessment and the activities to be planned and conducted for facing possible barrier effects.

### 1.1. Preparedness

This paragraph describes the activities of the Operations Centre during preparedness phase in order to solve barrier effects in case of major emergencies. More particularly, the Operations Centre shall conduct the following activities:

- monitoring the system's available resources (staff and equipment), indicating where they are located, their number and specific skills;
- understanding the need to harmonize individual protocols of deployment of teams or equipment and if needed, proceeding to it;
- constantly collecting the information related to communication system in order to understand its soundness and diffusion and the minimum requirements in case of emergency;
- understanding whether the chain of command is solid and clear and foresee the changes that may be needed;
- identifying the training needed in order to have a more proactive and efficient organization;

- collecting as much as possible data and information on single interventions and previous emergencies or their frequency and local distribution. This activity produces thematic maps, statistical graphs and daily reports that can be very helpful in major emergencies so to better understand the territory and its weaknesses;
- defining the communication procedures and ways to share relevant and valid information between involved institutions, services and staff;
- preparing SOP for the Operations Centre to know how to react in case of various types of emergencies and to train the staff;
- ensuring adequate IT support, back up communication and information sources.

#### *1.1.1. Access To Worksites*

It is useful during this phase and as to this issue, to collect and monitor data coming from the whole territory in order to have available maps describing what locations are harder to reach in case of emergency, their weaknesses and how to access them.

In the Italian experience, data are collected on two levels:

- the historical activity that includes collecting data about activities and interventions in both ordinary and complex emergencies, to build and progressively update the database including the past activities, the deployed resources, the criticalities faced and in what sequence. This database can be obtained automatically by linking rescue activity and resource management software and allows to draft maps with the historical memory not only of individual interventions, and of all the documents associated with them, but also, point by point, of all the interventions that have followed, so as to be able to draw risk and vulnerability indices,
- sensitive parameters, which consists of collecting data relating to strategically relevant or critical elements, which is important to know in order to deal quickly with an emergency with the necessary operational resources, rather than with appropriate procedures for the safety of aid workers, to prevent likely barrier effects or mitigate the presence of environmental risks (such as maps of flight obstacles, risk of hazardous substances, environmental risk, etc.).

More particularly, in fact, useful applications in case of emergency are planned in advance for different emergency scenarios and for the specific specialist activities.

### *1.1.2. Interaction With The Affected Population*

During this phase it is useful to study, evaluate and consolidate activities helping Assessment Teams to start working without being stopped by the population. Such activities should be part of training courses. Also, it shall be possible to assess and decide about the assessment team's modes of intervention. More particularly, during the Small-Scale Exercise it was tested whether the team should intervene *in incognito* and it did not result to be useful. In fact, the team was recognized anyway by the population because of the team members' backpacks, their reconnaissance activity and interviews to the population. On the other hand, if the team members do not wear a uniform, they put their safety at risk since they are not wearing appropriate clothing in the proximity of rubbles and also, they are hard to identify as team members.

### *1.1.3. Time Pressure*

Time pressure is a problem in each major emergency, in fact during preparedness teams should be trained to it, although it would be also useful to build a model for understanding the correct dimension or composition of the assessment team in relation to the emergency and its geographic extension.

The National Operations Centre in Italy, that belongs to one of the eight central directorates of the Department of firefighters, public rescue and civil defense, developed a method to assess the scenario as fast as possible as well as the resources to be handled and their location. Such a method could be usefully shared as it includes the following proven and decisive activities as follows:

- drawing up maps that allow to have general indications about the resources to be handled automatically according to the presumed scenario
- processing data and satellite images that allow in the early hours of a disaster to assess the scenario in detail, thus optimizing or integrating the resources sent, verifying the undamaged fast roads, as well as any environmental risks, etc.
- immediately collecting and processing data linked to the resources moved, the activities carried out, the areas of intervention, so as to provide immediately a common basis for monitoring the actions and planning the next steps.

### *1.1.4. Communications & IT*

In the preparation phase, it is useful to standardize information flow, disseminate them at all organizational levels and at the same time train personnel about it, which is a crucial activity of a National Operations Centre.

#### *1.1.5. Incident and Whole Emergency Management*

The National Operations Centre should identify and consolidate specific responsibilities during a major emergency within procedures as well as the roles linked to each of them.

#### *1.1.6. New Technologies Dependency And Support*

New technologies can be a problem and so a barrier when their number is extremely high and if they are not communicating with each other or not useful in the time they are needed. This is why a National Operations Centre should decide, in the preparation phase, what technologies should be used in an emergency case, usage time, ensure back up of communication ways and what kind of support is necessary.

Among the new technologies that can be decisive to deal with the barrier effect are the SAPRs (drones). The Italian experience is mainly based on high endurance fixed-wing SAPRs able to load up multiple payloads (sensors), be driven in bvlos operations (beyond the pilot's view) and stream images to remote operations rooms.

To this end, the National Italian Fire Corp. is involved in a currently unpublished experiment, with ENAC, ENAV and the Tuscan Regional Government, for the integration of SAPR (in particular fixed-wing mini type with radio link range over 80 km) in bvlos in the common airspace, while performing tasks.

Infrared sensors, and remotely streamed images expands the SAPR's use.

#### *1.1.7. Media Management*

Media management and correct information analysis and dissemination can be very helpful for the Assessment Teams. Therefore, it is important to have an organized and well planned media management both within National Operations Centre and the Assessment Teams.

The National Operations Centre should:

- identify reliable media (both for gathering and disseminating information)
- monitor information coming from the media
- cooperate and interact with the media
- communicate with the media, appoint staff in charge of releasing valid information, to ensure continuity in communications
- decide about the rules for releasing information, so as not to obstruct and complicate the tasks of the Assessment Teams.



#### *1.1.8. Use Of Air vehicles / Helicopters And Generally Air, Land And Water vehicles*

When it is difficult to reach the worksites during a disaster, it is then important to choose the most adequate means of transportation depending on the barrier effect.

During preparedness, each National Operations Centre can usefully gather information about all available and useful means of transportation, more particularly referring to air vehicles that can reach quickly inaccessible places. Therefore, the following should be defined for each aircraft:

- characteristics of each aircraft
- operational parameters of each aircraft and limitation of use
- loading plans divided between personnel and equipment and at least a first analysis on what are the best air vehicles according to personnel, equipment and emergency conditions.

#### *1.1.9. Activities Outsourcing*

During a major emergency it can be necessary for the assessment team to use resources that are not included in their equipment, so it shall be useful to understand, during preparedness, who shall be responsible to solve it and how to proceed.

### **1.2. Activation & Mobilization**

During this phase, the National Operations Centre shall receive the information about a major emergency and start to put together its extent.

The role of the National Operations Centre in this phase shall be to collect as much information as possible about the specific features of affected territory such as:

- land morphology
- roads' number, characteristics and accessibility
- updated information from drones or satellites and limits of its use
- weather conditions and weather forecast
- other unexpected obstacles that can affect Assessment Teams, such as cultural, sports or social events and previous activities and emergencies in the affected territory in relation to the disaster

- prepare standardized format of maps (or other data) to work on common format of files with all USAR assessment teams involved and other first responders.

#### *1.2.1. Access To Worksites*

The role of the National Operations Centre is to collect as much information as possible on the territory specific features such as, its morphology, road number and conditions, whether it is possible to have updated maps through satellites or drones and possible limitations. National Operations Centre also need to collect up to date information from road operators.

#### *1.2.2. Time Pressure*

The National Operations Centre shall usefully help the Assessment Teams in order to face any barrier effect, by monitoring the emergency and linking it to the type of resources to be mobilized, trying to relieve local command post activities and support them with the necessary resources.

#### *1.2.3. Communications & IT*

The National Operations Centre shall helpfully gather from the local command post the communications and IT resources needed in the emergency zone to be sure that the teams moving to the sites will rely on independent means of communication.

#### *1.2.4. Incident and Whole Emergency Management*

The National Operations Centre shall support when necessary all the roles that are managing the emergency at various levels to ensure smooth activation and mobilization.

#### *1.2.5. Dependency On New Technologies And Support Provided*

The National Operations Centre shall identify the best technologies that can be helpful during an emergency and monitor them, also it shall provide maps identifying necessary updates and available resources.

#### *1.2.6. Media Management*

The National Operations Centre shall give local and national media useful information about the emergency system that is going to be mobilized. The National Operations Centre shall also monitor the information disseminated by the media and support the local command post within such activity. Information release shall be considered as sensitive so as not to obstruct the Assessment Teams.

#### *1.2.7. Use Of Air vehicles / Helicopters And Generally Air, Land And Water Vehicles*

The National Operations Centre shall check the vehicles that can be easily used to reach worksites and/or if air vehicles are needed. If this is case, it shall start contacting specific players that shall

prepare and mobilize air vehicles. The National Operations Centre shall monitor weather conditions and forecast.

#### *1.2.8. Activities Outsourcing*

While collecting the early data of an emergency, the National Operations Centre shall evaluate the need for resources that may not be available and that may be outsourced, while identifying who, can provide what is needed, how and when.

### 1.3. Deployment

During deployment the National Operations Centre shall decide which are the teams to be deployed to the emergency sites. Such decision is to be taken gradually and taking into account the skills and the abilities of the early teams that are going to reach the emergency. The National Operations Centre shall plan for the following steps and prepare for the oncoming operations to cut down operating time.

#### *1.3.1. Access To Worksites*

During this phase the National Operations Centre should ensure that all the available information about accessing the worksites have been correctly given to the teams being deployed (updated maps, accessible roads and possible problems).

#### *1.3.2. Interaction With The Affected Population*

In the event that near the worksites there is a substantial number of inhabitants, the National Operations Centre shall support deployed teams in order to decide what the best interaction strategy is.

#### *1.3.3. Time Pressure*

In this phase the National Operations Centre shall consider the necessary number of Assessments Teams and their composition on the basis of the extent of the emergency and the number of potential worksites to be assessed in order to perform their tasks in the shortest possible time.

#### *1.3.4. Communications & IT*

In relation to the barrier effect in this phase, the National Operations Centre shall decide the necessary means of communication to be given to the Assessment Teams through its territorial offices.

#### *1.3.5. Incident and Whole Emergency Management*

The National Operations Centre shall ensure disseminating the necessary information about the emergency to the involved institutions, authorities and services, raise their awareness and ensure their preparedness for oncoming activities.

#### *1.3.6. New Technologies Dependency And Support*

On the basis of the whole picture, the National Operations Centre shall be able to give the assessment teams mapping technologies including drones according to the extent of the emergency. The IT support should be activated to provide appropriate assistance if needed.

#### *1.3.7. Media Management*

The National Operations Centre shall always manage the general media, while also during the deployment phase it shall collect the information from the media and disseminate them to the Assessment Teams while at the same time inform the media about what the public needs to know. The National Operations Centre shall inform the teams about how to interact with the press and media.

#### *1.3.8. Use Of Air Vehicles / Helicopters And Generally Air, Land And Water Vehicles*

In case of need for a specific vehicle, in this phase the National Operations Centre shall organize all the specifics details. Upon deciding to use an air vehicle, the following issues shall be decided:

- number of persons and equipment (with the indication of type, dimension and weight)
- loading plan
- identification of the most feasible air vehicle
- weather conditions monitoring and forecast;
- flight plan together with departure and landing site of the assessment team.

#### *1.3.9. Activities Outsourcing*

If during the phases of activation and mobilization it was decided to use internal and external resources, the National Operations Centre shall do what is necessary to reach such a goal by giving all the necessary information to the concerned teams.

## 1.4. Operations

During the operations phase, the National Operations Centre and the Assessment Team shall communicate directly, so that any assessment difficulty can be directly exchanged between them, while the information flow shall be as much organized as possible also between National Operations Centre and the local command posts.

If there are several assessment teams, the competent representative of the National Operations Centre shall interface with the USAR Team Coordination Centre (hereinafter UCC).

### 1.4.1. Access To Worksites

As to this barrier effect, the National Operations Centre shall provide the assessment teams with information about accessing the worksite while assessing the need for other support activities. The National Operations Centre shall disseminate and gather information about access to communication with the Operations Centres of other emergency services and involved institutions and authorities, or other relevant national information sources or institutions.

The Italian experience led to an agreement with the Italian Space Agency (ASI), thus, it is possible to immediately proceed to analyze images and satellite data, before and after the event, so as to immediately identify the location and extent of the emergency scenario, any critical issues, the state of the road system and alternative routes, etc..

At the same time, the national building registry records shall be used to identify the type of building involved in the event and likely vulnerability indexes.

The above analyses shall be carried out in parallel with the arrival at the National Operations Centre of the first checks from the affected areas, in terms of rescue calls or checks by the early teams of rescuers intervening.

Therefore, the representatives of the area shall be supported in identifying the areas to be dealt with as well as in defining a plausible zoning of intervention, so as to immediately direct the operating modules, automatically transferred by the National Operations Centre, towards the assigned work areas. And, vice versa, in the meantime the additional resources to be sent on site shall be fine-tuned on the basis of the zoning and type of expected interventions.

### 1.4.2. Interaction With The Affected Population

If the assessment teams have difficulties in interacting with the affected population, and this can disrupt their work, the National Operations Centre shall decide on supporting activities by first responders that can help teams perform their specific task.

#### *1.4.3. Time Pressure*

In order to help teams with time pressure, the National Operations Centre could decide to send other assessment teams or first responders.

#### *1.4.4. Communications & IT*

During the operations, the National Operations Centre shall evaluate and decide if the assessment teams need support as to means of communications and provide additional resources.

#### *1.4.5. Incident And Whole Emergency Management*

During the operations, the coordination of the whole emergency by the National Operations Centre is crucial and its representatives shall be very careful in checking the decision flow and the interaction of all the involved players.

#### *1.4.6. New Technologies Dependency And Support*

At this stage, mapping and drones shall be used and the National Operations Centre shall check that the outcomes are correct and disseminate the results to the concerned teams.

#### *1.4.7. Media Management*

During this phase, the National Operations Centre shall continue to monitor the media data and pass relevant information on to the teams.

#### *1.4.8. Use Of Air Vehicles / Helicopters And Generally Air, Land And Water Vehicles*

At this stage, when helicopters and all other vehicles shall already be in use, the National Operations Centre should manage and coordinate them by providing info to the teams conducting the assessment and receiving feedback from them. Such information is essential for the teams in charge of operations.

#### *1.4.9. Activities Outsourcing*

The National Operations Centre shall monitor the ongoing outsourced required activities and decide on other necessary resources.

## **2. LOCAL AUTHORITIES**

While analysing the issues behind barrier effects, the Project Team identified local authorities as very important players able to offer support and to resolve some of the issues.

Generally speaking, in case of a major emergency, local authorities can support the Assessment Teams and in general deal with the whole emergency, depending on two possible situations as follows:

1) the major emergency has affected and destroyed the coordination and support capacity of the local authority

2) despite a major emergency, the local authority management response system is still operating.

In the first case, local authorities are not able to provide any information to the assessment teams and to the other players involved in the emergency. For this reason, the teams have to get the following information by themselves:

- Local Emergency Plan that could have been uploaded on a Cloud
- geographical morphology of the territory
- density and distribution of the population
- road network access
- buildings' vulnerability.

In the second case, the system is still working, local authorities are able to provide information through identified and consolidated representatives.

In both cases, it should be very important for local authorities to know how in general information is stored. Actually, if the Local Emergency Plan and all other relevant information on the area were to be kept in a public yet not local facility, it should be always possible for public authorities needing them to obtain them, in order have the necessary data for search and rescue.

In fact, even if the local authority system is able to deal with the emergency, research and data transmission are time consuming, also requiring someone that shall gather and provide them. Of course, this activity is going to be duplicated depending on the number of local authorities involved in the major emergency with a growing waste of time and of human resources in giving and receiving information on the affected sites.

It would be extremely useful if these data were not only immediately available to the public entities involved in the emergency but also were in a standardized form so that data would be totally compatible.

Such activities should be identified and undertaken during preparedness and it would be necessary to involve all actors that shall provide or receive such information.

## 2.1. Preparedness

The activities mentioned above shall be part of the preparedness phase, while involving all the stakeholders interested in providing such information.

The phase of preparedness is when, with no ongoing emergencies, local authorities plan collecting data and informing the population so that, in case of emergency, it shall be possible to manage the emergency at best while taking into account all the players interfacing onsite.

In doing so, local authorities should take into account the various types of risk which their areas of competence are exposed to and imagine the type of information to be provided according to the potential disaster: fire, earthquake, flood, and so on, while at the same time, assessing the different types of rescuers in connection to the necessary information.

### 2.1.1. Access To Worksites

Regarding any difficulty that an Assessment Team may encounter to reach the disaster site, the information provided by local authorities shall be useful to face and possibly to overcome it, mainly including suitable landing areas for air vehicles near the affected areas and the road network access to the emergency site.

Local authorities therefore shall:

- make a map of the potential stopping places and landing areas in their territory and update them regularly.
- regularly update the various road network plans and the possible access roads to their territories.

### 2.1.2. Interaction With The Affected Population

To make sure that the population shall be prepared to move and interact with the rescuers, it is necessary that people are informed (by for ex. Safety Campaigns done with the use of posters, etc.) about features and weaknesses of their territory as well as of any related Local Emergency Plan.

Thus, it is essential that while drafting an Emergency Plan, local authorities shall analyze the weaknesses of their territory in order to assess and include the most appropriate behaviors and actions in the procedures, as well as identifying waiting areas and shelters.

Such Local Emergency Plans shall be disseminated widely within the territory so that the population shall learn about them and comply with them as much as possible.



### *2.1.3. Communications & IT*

As to communication with the population and how to make them, local authorities shall assess the following:

- whether creating an alert system in case of natural disasters, defining how the population can be informed about it and register.
- identifying the information tools to reach the various segments of population, while defining different means so that the largest number of people shall be reached through different means (homepages of the local authorities, newspapers, radios and TV station, etc..)
- when it is necessary to pre-alert the population and how, for instance in case of a meteorological warning, while taking into account the geographical distribution of the potentially affected population.

Local authorities in addition shall assess the weaknesses of their communication networks and decide if and how to strengthen them.

### *2.1.4. Incident and Whole Emergency Management*

In case of a natural disaster of such magnitude to require the support of non local players, it is necessary that local authorities of different types are informed and are appropriately included in the information and management flow of those managing the various emergency levels. It is therefore extremely useful that local organizations and their members are correctly trained and informed about the information flows to and from the local authorities.

### *2.1.5. Media Management*

Media management, and currently of social media as well, is essential during an emergency. For this reason, during the phase of preparedness, local authorities shall define the media to be used in case of emergency and how to manage the information coming from them as well as from social media, while deciding more particularly not only which social media should be monitored but also whether to do it in a one way or two way form.

### *2.1.6. Use Of Air Vehicles / Helicopters and Generally Air, Land And Water Vehicles*

During preparedness, as to the information about the use of air or other vehicles near the locations of a possible emergency, please see Paragraph 2.1.1 Access To Worksites.

### *2.1.7. Activities Outsourcing*

By activities outsourcing, it is intended all the needs to identify tools or resources which may not be immediately available to the rescuers from non-public and/or not directly involved entities.

It would be useful if the local authorities were updated while consulting the site, highlighting the available companies authorized to provide goods and service in case of need, also considering to test periodically the preparedness of those companies and their true ability to provide support when needed.

## 2.2. Activation & Mobilization

During activation and mobilization, the rescue teams and the USAR Assessment Team shall travel to the emergency site.

### 2.2.1. *Access To Worksites*

In order to make the work of the USAR assessment team more useful and effective in the shortest time, as much as possible during a natural disaster, involved local authorities shall find information about the conditions of the road falling under their responsibility and about the most suitable means of transportation to reach the affected areas and pass them to the rescue teams through pre-set channels.

### 2.2.2. *Communications & IT*

After a disaster, local authorities, possibly, shall assess whether the communication network is operating and/or is damaged, and as a result, identify the means of communication to inform the affected population and the various entities involved in the rescue.

### 2.2.3. *Interaction With The Affected Population*

During the mobilization of rescuers, the local authorities affected by an emergency should verify, as much as possible, that the population is supported in behaving in compliance with the local Emergency Plans, by mobilizing in turn, the entities in charge of the various activities of such Plans.

### 2.2.4. *Use Of Air Vehicles / Helicopters And Generally Air, Land and Water Vehicles*

In case the emergency is such that rescuers must use specific means of transportation in order to reach the emergency location, Local Authorities shall consult their Local Emergency Plans to verify alternative road accesses and/or stopping places or suitable landing areas for air vehicles.

## 2.3. Operations

During the operation phase, the USAR Assessment Teams, upon reaching the emergency site, shall start assessing the situation, in the following paragraphs the interaction between the Teams and local authorities are illustrated.

### *2.3.1. Access To Worksites*

In this phase, the local authorities shall update in cooperation with National Operation Center information on road conditions or difficulties to reach the affected areas and share them with the various entities involved in the emergency.

### *2.3.2. Interaction With The Affected Population*

If the local authorities involved in the emergency managed to get the affected population to comply with the Local Emergency Plan, the USAR Assessment Team shall find it in the allocated areas and shall be able to reach more easily the areas needing an assessment.

### *2.3.3. Communications & IT*

While the USAR Assessment Teams shall be about to perform their tasks, local authorities shall be able to provide the following information, about whether the communications network is damaged or is still usable, and about the population (most critical areas, most inhabited areas, distribution of population within the territory).

### *2.3.4. Media Management*

In this phase of the USAR Assessment Team's work, local authorities shall share information collected through local media, including social media with rescuers, to help them understand where it is most urgent to start.

It should be useful that local authorities together with National Operations Center prepare a Plan of Press conferences in order to be shared with USAR Teams to keep the line in the way of presenting actual situation.

### *2.3.5. Use Of Air Vehicles / Helicopters And Generally Air, Land And Water Vehicles*

Upon identifying the specific transport needs of the Assessment Team, thanks to the interaction with the local authorities concerned, it shall be possible to select and plan for the most appropriate vehicles for transporting the Assessment Team and any necessary additional transfer after landing with an air vehicle near the emergency.

### *2.3.6. Activities Outsourcing*

If the USAR Assessment Team shall need unavailable tools or equipment for performing its task, the local authorities concerned may use authorized companies currently listed on the ANAC (National Anti-Bribery Authority) website or if not possible or unhelpful to resolve the situation, shall refer to the local or national branches of the Civil Protection Department.

### 3. FIRST RESPONDERS

Immediately after a major emergency, rescue starts quite spontaneously with volunteers helping people involved in the emergency.

After a short while, the local rescue system sets in motion and mixed teams made of fire fighters, police, medical and health rescuers are joined by volunteers, under the coordination of local healthcare emergency services and local civil protection.

These first responders normally reach victims that do not require specific equipment to be rescued and fire fighters are equipped with standard tools.

While first responders are saving victims, other specific teams shall be activated and mobilized in order to face the whole emergency.

The USAR teams arriving during the next phase of the emergency can work 24 hours a day for several days without burdening the local resources, with special equipment in line with the emergency situation.

The interaction between first responders and USAR Assessment Teams is crucial in order to collect correct information on the overall emergency and interact positively with the affected population. Also specific exercises for first responders should be established on local and national level at least annually.

#### 3.1. Local Fire Department Teams

##### 3.1.1. *Preparedness*

In order to ensure the highest cooperation between the local Fire Department Teams reaching first the scene of the emergency and the Assessment Team following a few hours later, it is extremely important that the staff of the Fire Department local command teams are informed about the role and tasks of the USAR Assessment Team in case they shall intervene after a disaster.

The local Fire Department teams are the first to start search and rescue. They realise about the extent of the disaster and at the same time feel emotionally involved in the events. Such teams are a valuable source of information for the Assessment Team, although it may not be easy to interact effectively with them upon the Assessment Team's arrival as they are already working.

It is therefore essential to be able to inform, in times of preparedness, when no emergency is taking place, Fire Departments about tasks of the Assessment Teams and the data they shall need upon arrival.

More particularly, the local teams of the Fire Department shall be able to provide support and intervene with regard to the following barrier effects:

- Access To Worksites, the Fire Department local teams are from the area, are familiar with the road network and may know about any critical issues that may arise from the disaster. They can therefore suggest the best routes and the most suitable means of transportation to reach the emergency sites.

- Interaction With The Affected Population, they can act as an intermediary between the population and the USAR Assessment Team to help find useful information. They can also provide information on the inhabitants of the affected area and share the first information collected.

- Time Pressure, the Fire Department local teams involved in the emergency may also be made of local residents, who if not adequately informed about the role and activities of the Assessment Team, may cause a barrier effect by adding pressure on it.

- Communications & IT, getting correct and timely information on the event is a real added value for the Assessment Team, thus, it is essential for the first responders to be specific.

- Incident And Whole Emergency Management, the Fire Department local teams that understand the Assessment Team's role and tasks can therefore provide appropriate support.

In order to prepare and organize the Fire Department local teams for appropriately supporting the Assessment Team, the following information on the USAR Assessment Team shall be included in an information sheet as follows:

1) the composition of the Assessment Team, with roles and functions;

2) the situations and conditions in which the Assessment Team works;

3) interaction with the Assessment Team (the Fire Department local teams provide first aid and then identify the team member who can leave the site to provide information);

4) the information to be provided to the assessment team, mainly divided into:

a. updated road conditions

b. most suitable means of transportation

c. information from the population in various forms (interviews, requests for help, local and social media, etc...)

d. most critical areas (as to population density, terrain characteristics etc.);

5) to usefully provide this information, an individual from each team shall be identified and informed to play the role of liaison officer.

### *3.1.2. Operations*

During the operations, i.e. when the Assessment Team reaches the emergency site, the Chief of the Fire Department local team who has intervened as first responder shall briefly leave the team and inform the Assessment Team as indicated in the information sheet, thus helping overcome the following barrier effects:

- access to worksites
- interaction with the affected population
- Communications & IT.

### *3.2. Civil Protection Volunteers*

The local civil protection volunteers are among the first rescuers to reach the emergency site together with the Fire Department local teams; their support in the early hours of the emergency is essential but if not properly "controlled" risks bringing problems in addition to benefits.

When a natural disaster occurs in a territory, in the case of Italy, it is the Municipal Operations Centre that activates the civil protection units part of its municipality and, depending on the size of the disaster, such activity occurs also at a provincial and regional level.

Once this mechanism is triggered, the civil protection units reaching the affected site shall accredit themselves over the local civil protection representatives.

The movement of such volunteers may be an issue as there is no upstream control of the departing volunteers' units, yet, once the system is triggered by the Municipal Operations Centre, any voluntary civil protection unit that deems itself useful on site can decide to join and offer help.

This situation can lead to an imbalanced activation in terms of numbers and specialties required, and since sometimes it's a matter of self-activation, it is difficult to have an idea of who is going to the site and what specialties they have before accreditation.

All of this leads mainly to two negative results: the excessive number of civil protection voluntary units and two or more of the same type of units to the detriment of others that are lacking.

The negative results end up amplifying some barrier effects that can prevent the USAR Assessment Teams from reaching the emergency site easily, such as:

- Access To Worksites, the number of volunteers moving to the site may risk further blocking access routes.

- Interaction With The Affected Population, too many people present make it difficult and confusing to collect information from them.

- Time Pressure, as time goes by, the Assessment Teams experiences a growing tension due to difficulties in moving and interacting with the population.

- Communications & IT, it becomes extremely complex for the USAR Assessment Team, given the numerous entities interfacing on the ground, to have a clear picture and correct information.

- Incident and Whole Emergency Management, the management of the emergency at all and any level is further complicated by the number of entities present in the area affected by the disaster.

It would therefore be desirable for voluntary civil protection organisations at various levels (municipal, provincial, regional and national) to raise their awareness during preparedness, when no natural disaster is taking place, about the need to set up a system allowing for identifying as follows:

- the most disaster appropriate type of team
- the number of suitable teams and their distribution on the territory.

#### 4. NATIONAL USAR

Concerning the National USAR, it shall be essential to describe the interaction with its teams and the overall national emergency system, that is to say:

- when and how the USAR Teams are activated and deployed
- how USAR Teams are distributed within the country and what is the command flow deciding about their activation

- if the overall activities of the National USAR teams reflect the INSARAG guidelines, more particularly as to the possible USAR modules (light, medium and heavy) describing also the interaction with national Fire Department training, tasks and skills.

It shall then be useful to focus on the main features of each USAR team module in order to understand training, activation and tasks in detail.

Special focus shall be paid to the USAR Teams' assessment tasks emphasizing the following aspects:

- the stage of the emergency when Assessment Teams are decided upon and their tasks at each phase,
- the aim of the Assessment Teams and the resources, the tools and the equipment planned for them,
- the composition of the Assessment Teams and team members' roles and responsibilities,
- the assessment tasks undertaken by the team, their planning and delivery,
- the compliance of the activities with INSARAG guidelines and how to improve some aspects that are not fully dealt with (such as ASR1).

More particularly, it shall be useful to specify:

- the characteristics of the various USAR teams in the national context, such as Light, Medium and Heavy, indicating the conditions of use of the team and its training and education,
- the various operational levels of assessment, identifying their characteristics and the entities taking care of them,
- the tasks of the assessment teams including the entities they interface with at national, local as well as USAR coordination level (UCC).

As to the composition of the assessment team, the team staff training and the skills the team members must have in order to perform the USAR assessment at best and deal with the barrier effects, it is useful to suggest as follows:

- Module Leader (Management)
- Liaison Officer (Management)
- Staff Officer (Staff Management)
- Structural Assessment Officer (Reconnaissance and Assessment)



- Haz-mat assessment officer (Reconnaissance and Assessment)

At least one of the staff members shall be experienced in cartography, IT and communications and shall be familiar with IT platforms in use at national and INSARAG levels.

The Team' activities and corresponding skills shall be as follows:

- 1) facilitating the set-up of the coordination structure of the USAR modules (UCC) in line with the resources deployed on site for initial planning of search and rescue activities
- 2) dividing the assigned area into sectors if not previously identified (ASR1)
- 3) defining the operating priorities within the assigned sectors (ASR 2), i.e. identifying the sites where there may be survivors
- 4) drafting the necessary maps for both the assessment and later rescue teams
- 5) providing instructions to the various module means, as to the ordinary road network within the area of interest.

The professional figures performing the functions referred to in item 3, in the USAR M team, shall be as follows:

#### **Officer In Charge Of The Expeditious Assessment And Safety Of Structures**

During the reconnaissance/assessment for the purpose of identifying operational priorities, such officer shall carry out the following tasks:

- getting information on and assessing the sites from a static point of view, identifying any precautions and expeditious securing operations
- proceeding to an initial voice and visual search (call-out) to detect survivors
- establishing priorities in search and rescue operations, on the basis of the ascertained or presumed presence of survivors
- providing for marking the site, according to the provisions of the INSARAG guidelines

#### **Haz-mat Assessment Officer**

During the reconnaissance/assessment for identifying operational priorities, such officer shall carry out the following tasks:

- getting information about the presence of hazardous substances and plants, identifying any precautions and operations of securing the shipment
- collaborating in an early voice and visual search (call-out) to detect survivors
- collaborating in an expeditious triage aimed at ascertaining the presence of hazardous substances and systems
- suggesting the use of "specific" PPE as well as any additional safety measures as to the presence of hazardous substances.

A proper execution of these operations (ASR2) shall allow for a rapid organization of rescue activities through effective planning and proper management of resources.

The **Management and Staff Functional Unit** shall include the following professionals:

**Team Leader**

He or she shall coordinate the activities of the assessment and planning unit team in synergy with the other locally activated Fire-fighters' coordination facilities.

**Liaison Officer**

Such officer shall liaise with the members of the Civil Protection system on site (representatives of the local Civil Protection system, Healthcare Rescue, Police Forces, etc.) and

- shall get information about the state of the sites before the disaster and the presumed number of victims involved
- shall keep in touch with the communication bodies in the vicinity of the operational area, keeping the Module Manager (Team Leader) informed in accordance with the Department's institutional communication policies.

**Staff Officers**

They cooperate with the other members of the Reconnaissance and Assessment Team in developing the initial planning phase, more specifically:

- setting up the USAR Coordination Structure (UCC);
- dividing the assigned disaster area into sectors, if not previously done

- processing data received from the USAR assessment teams on site, through a specific software also used for Planning
- drafting the necessary maps for the assessment teams and for the subsequent rescue teams
- entering all data/information (information from local people, local rescue system, assessment teams, etc.). related to the defined sectors in specific digital forms.

Training and preparation of the USAR staff who may be part of the USAR Assessment and Reconnaissance Team, that can be extended to all types of USAR Module (Light, Medium, Heavy, should include the following:

- organization and participation in national and international exercises (full scale exercises)
- organization of and participation in national and international field exercises for USAR assessment
- simulated USAR assessment exercises (table top exercises);
- UCC training (an important coordination tool that becomes more efficient if the teams in the area of intervention are formed in a homogeneous and adequate way)
- interacting with the involved population, usefully drafting guidelines as a reference document after training
- interacting with local authorities and first responders, in order to understand what information to gather and how to do it.

As to the assessment team's training, a special program including information and practical and assessment-oriented activities shall be provided for the team's staff. Such training activity was provided to the Italian team that participated in the Small Scale Exercise included in the EASeR project and then tested during the exercise itself. These training contents were extremely useful to the team and were further revised and integrated in the light of the results of the Small-Scale Exercise in a format called "Assessment Team Training Programme" which is attached to these procedures (Annex no. 1).

With regard to the assessment team's technical equipment and backpacks, please refer to Annex no. 2 called "Equipment variant of the Assessment Team's Backpacks".

#### 4.1. Preparedness

In addition to an appropriate training course, the USAR Assessment Teams, during preparedness, shall be ready for deployment by:

- being constantly ready to deploy rapidly (i.e. by keeping equipment stored in accessible 24/7 store and being always available thanks to proper schedules),
- keeping a monthly service specifying the members of the assessment team and their tasks (based on personal skills),
- developing procedures for activation and mobilization with the support of different means of transportation, aimed at overcoming the barrier effects, also in outsourcing,
- constantly updating tools and equipment necessary for assessment.

#### *4.1.1. Access To Worksites*

During preparedness and in relation to work sites access, personal equipment facilitating access to it shall be usefully provided for.

In particular, it should be kept in mind that:

- personal equipment of the individual worker is essential, as the assessment team will reach the site before the rest of the team,
- each team member shall carry individual equipment contained in a specific "ready to go" aid pack, allowing to be self-sufficient until they are reunited with the rest of the USAR Team,
- the technical equipment of the USAR Assessment Team must contain both logistic support equipment for initial planning and management and specific tools and equipment for the assessment workers.

#### *4.1.2. Interaction With The Affected Population and Time Pressure*

Interaction with the population affected by the disaster is one of the most delicate aspects that a rescuer has to deal with during an emergency.

"Emergency" for a USAR Assessment Team is a term that encompasses a set of environmental conditions, closed and open spaces, desorganization, interrupted or exceptionally modified roads and accesses, where a highly emotional and desperate atmosphere is exacerbated by the extent/time pressure of the emergency, thus, making it more difficult to interact with the affected population. In certain contexts, the organisational response, in addition to the technical and professional skills, must possess and use "emotional containment" skills, both with the victims in order not to further worsen the suffering of the affected person, and towards themselves and their colleagues in order to facilitate site assessment.

In addition, any language and cultural barriers and dysfunctional communication with players on the ground can cause additional stress, with possible misunderstandings, complications and operational delays.

The purpose of emergency psychology is to study, treat and prevent psychic processes, emotions and behaviours that occur before, during and after critical events. It shows that interventions in peri-traumatic contexts involve and are mainly aimed at "ordinary" people, who react ordinarily to an out of the ordinary situation.

During the preparation phase for every possible emergency (Preparedness) and in order to be able to deal with it effectively, primary prevention work must therefore be done by informing and training specifically on such issues, to make the rescuers not only reactive but also aware and proactive about stress conditions affecting themselves and others.

#### *4.1.3. Communications & IT*

During the preparation phase, the Assessment Team shall update communication equipment, so as to ensure the flow of information even in difficult conditions such as, for example:

- damaged and/or overloaded communications infrastructure,
- excessively used communication channels,
- lack of reliable means of communication.

During the preparation phase, equipment care and maintenance shall be paramount.

#### *4.1.4. Incident and Whole Emergency Management*

All the activities resulting from defining the roles and tasks related to the barrier effect linked to the Incident and Whole Emergency Management, during preparedness include planning the activities of the USAR Coordination Centre (UCC) and its interaction with the various assessment teams onsite during the emergency, particularly defining decisional and communication flows.

#### *4.1.5. New Technologies Dependency And Support*

The Insarag guidelines followed in the organization of the international USAR teams include filling up paper forms for collecting various information directly onsite such as for instance:

- site identification (address, coordinates, number of missing persons, etc.),
- report of the Operations team (planning work to do, necessary resources etc.),

- extrication of entrapped victims (personal information, identification marks, site of extraction, etc).

The example and the experience of the Italian teams led to the creation of a System named Prometheus which plays an essential support role for overcoming the barrier effect, as it acquires data from the sites and transmits organized information in a digital form. Such information analyzed within a database allows for prioritizing interventions and optimizing onsite resources management.

The Prometheus system was created in order to digitally collect, transmit, manage and analyze data coming from emergency scenarios (earthquakes, collapsing buildings, attacks etc.).

The Prometheus platform is made of three areas:

- data acquisition,
- data transmission,
- information analysis and management.

#### Territorial Data Acquisition

Developed on an Open Source software platform, Prometheus allows for the creation of custom forms that can be filled in using normal Tablets and/or Smartphones provided to the Assessment and Operations Teams operating on site.

Prometheus currently has 10 modules, some of which are provided for in the INSARAG guidelines and others developed to complement them:

- Team Factsheet
- Worksite Triage Form
- Triage Within Site
- Work Site Report Form
- Victim Extrication Form
- Demobilization Form
- Clear Form
- Dead Form

Prometheus also allows sending photos, gps points, shape files of site boundaries and audio comments with any form.

#### Data Transmission

The data collected on the mobile devices shall be forwarded to a Server which can be accessed through specific authentication. Prometheus is an extremely versatile tool that can be used in two different configurations:

- **predefined:** efficient and accessible data network, this allows us to forward data to a central server that can be consulted by all authorized operators (for example the person responsible in the Crisis Room)

- **local:** in case the data networks are collapsed or congested, Prometheus is designed to work on small servers, through local wifi bubbles.

Data transmission shall be two-way between the UCC, the assessment and operations teams. Data synchronization with the central server shall be guaranteed as soon as data connection shall be available again. (added now)

### **Data Management and Processing**

Prometheus automatically manages, processes, compares and filters received data, allowing the management coordinating the rescue to have a clear and real-time view of the emergency and the used and available resources.

### **Use of Prometheus To Overcome The Barrier Effect**

During emergencies, on the basis of the results obtained from the survey carried out in the course of this project, with 12 USAR teams from various parts of the world, some of the biggest obstacles to rescue during the assessment phase resulted to be as follows:

- interrupted road network
- adverse weather conditions
- people asking for and needing help
- overcrowding caused by rescuers and bystanders.

In a situation like this in the first hours/days, the flow of information shall sharply slow down due to congested communications. The INSARAG guidelines require a series of paper or PDF forms to be filled in by the assessment and operations teams, which must be handed over to the UCC. The paper forms, once filled in, must be physically brought to the UCC.

This leads to a number of problems, for example:

- long time for transporting the forms to the UCC (road network problems, traffic etc.)
- data included in the forms shall not be processed until they physically reach the UCC
- possible errors in data transcription or handwriting interpretation by UCC staff.

The PDF forms that can be filled in even if sent via a device to the UCC, while guaranteeing immediate receipt of the data, do not produce an overall view of the priorities, are not an efficient tool for emergency coordination and their use implies, however, a transcription involving issues of time and any material error. These limitations lead to a significant delay in the emergency management at the expense of the rescue.

With Prometheus, on the other hand, data is sent in real time and all forms will be filed in crossing databases to display the information in the best way and format to be analyzed. All the information

received shall be filtered and sorted automatically so that there shall always be a clear situation of the emergency, the teams deployed, the criticalities and the available resources.

It shall be automatically possible as follows:

- to know the available teams and their characteristics
- to assign the team by sending an assignment form that is automatically filled in by taking data from the Worksite Triage Form
- to cross-reference the data of missing victims with those of identified and extracted persons
- to have a real-time logbook of the various operational sites
- to have a real time clear mapping of the operations teams
- to have a map about closed and cleared sites
- to have a cartography with ASR5
- to have summary forms of the various sectors or wide area
- to have mapping in ASR5
- to know available needs and releasable resources.

#### **Staff Training On Prometheus**

The use of technologies applied to rescue involves a series of initiatives aimed at training all operating, staff and management personnel. Training should be calibrated according to the role that is played within the USAR team, more particularly specific training should be provided for:

- Assessment Teams
- Operations Teams
- UCC members.

#### **Technological Limits**

The use of technology in rescue involves paying attention to everything that is complementary to it. In case of devices, for example, attention must be paid to battery life. Taking into account the type of places where the assessment teams shall be dispatched, probably it shall not be possible to recharge devices. The lightest and most convenient solution consists in using power banks calibrated for the type of device, which ensure uninterrupted use for at least 10 hours. Some models are equipped with solar panels that allow for independently recharging the power bank.

#### *4.1.6. Media Management*

The media management guidelines shall be drafted during preparedness in general by the appropriate offices within the various National Operations Centres, while defining, where necessary, also any training need.



#### *4.1.7. Use Of Air Vehicles / Helicopters And Generally Air, Land And Water Vehicles*

The equipment of the assessment team can be scaled based on the loading capacity and the type of means of transportation deemed more adequate to reach the epicenter of the disaster, the selected means based on the news about the emergency scenario (ground means, helicopter and other air vehicles, outsourcing).

The choice of such equipment is the result of the experience gained during previous deployments, drills and retraining.

### *4.2. Activation & Mobilization*

#### *4.2.1. Access To Worksites*

The mobilization of human and instrumental resources for reconnaissance and assessment shall take place as fast as possible. The assessment team shall always be ready for departure, thus it is essential to define preventively the most suitable means to reach the affected area as fast as possible.

Immediately after activation, the Assessment Team Leader shall get information about the characteristics of the affected areas and its conditions after the disaster.

Such information can be acquired directly from the National Operations Centre, the territorial emergency managers and eventually from the local authorities in case the local response system is still able to provide support.

#### *4.2.2. Communications & IT*

During mobilization, it is important to check that all electronic devices are properly working.

The staff in charge of Communications and data transmission require information about the conditions of the infrastructure and the communication networks of the affected area as well as their coverage so that the USAR team's communications shall be planned.

#### *4.2.3. Incident And Whole Emergency Management*

During the mobilization phase, the USAR Team Management shall:

- update and draw up the factsheet of the Team, to be given upon reaching the site,
- brief the staff,
- identify the most suitable means of transportation for the USAR assessment team (by air or land, outsourcing),

- collect information on the affected area (size, morphology of the territory, weather conditions, presence of hazardous substances used or stored in the site, construction characteristics of buildings),
- monitor the social media,
- collect and update road information in order to reach the affected area,
- draw up constantly the necessary documentation,
- keep in touch with the National Operations Centre and the local Command to receive instructions on deployment in the affected area,
- coordinate itself with other mobilized USAR Medium teams,
- get information about the available means of communication,
- identify the chain of command on site,
- check the appropriate equipment according to weather conditions,
- acquire updated maps of the affected area,
- draw up an Action Plan.

#### *4.2.4. Use of Air Vehicles / Helicopters And Generally Air, Land And Water Vehicles*

In this phase, the way that the team shall reach the place of the emergency, shall be decided as follows:

- Mobilization by land, mainly dependent on the distance factor. Except for some borderline situations where climatic factors or the isolation of the place to be reached requires using other means, it shall be necessary to use vehicles, both for approaching the heart of the disaster and for methodically and quickly assessing the situation.

It shall also be essential to have a local driver, possibly someone from the place who knows the communication routes, the areas, the reference points of interest, the potential hazards, the language and/or dialect used in the place of intervention.

- Mobilization by means of helicopters and other air vehicles, on the basis of the resources of the entity the assessment team belongs to, in coordination with the National Operations Centre, or through outsourced resources. In any case, it should be noted that such mobilization shall allow for:
  - early deployment of resources by cutting down time pressure,

- reaching areas that are difficult to access by land as a result of variables that could limit access to the epicentre of the disaster and that may be linked to: particular weather conditions, impracticable roads due to damaged infrastructure and excessive requests for help from the populations involved in the suburbs.

Depending on the type of activation, the composition of the assessment team and the equipment to be boarded may also vary.

### 4.3. Deployment

In the national experience of the Fire Department Assessment Teams, deployment cannot be considered as separate from activation and mobilization on the one hand and the start of operations on the other, and for this reason there is no description of the barrier effects after deployment.

### 4.4. Operations

#### 4.4.1. *Access To Worksites*

After being assigned goals and tasks, the USAR Team Management will request information regarding access to the local road system to reach the assigned sectors or sites.

Such information can be requested to the National Operations Centre, the resources of the local Fire Department, as well as Local Authorities (Mayor).

The information received shall be useful in choosing the most suitable and fastest means of transportation to reach the assigned sector/site.

#### 4.4.2. *Interaction with the Affected Population and Time Pressure*

##### Psychological Aspects

During the impact phase (Operations), the rescuers of the Assessment Team must be able to understand, control and drive the acute, intense and potentially destructuring emotional reactions, during an evolving crisis, trying to manage them in the best possible way according to the critical situations they encounter. In the light of the above, it is important to consider that the main barrier effects also include issues resulting from the human factor, the management of the nature of all the players involved in critical events and their actions, their behaviour and the psychosocial and interrelational aspects linking them.

Therefore, it is important for the Assessment Team to acquire some non-technical skills or cognitive abilities such as "communication," "situational awareness" and "teamwork." Also the team shall learn how to support employees/colleagues and resolve possible conflicts by exchanging functional information and "manage stress" as it is important to correctly identify any sign of stress, recognize its effects and implement the most effective strategies.

### Operational Aspects

#### First Rapid ASR2

First Rapid ASR2 is a first targeted assessment of sensitive buildings. It can be carried out based on prior plans of local authorities (e.g. municipality) that perform an ASR1 of their territory according to criteria allowing to divide it into homogeneous sectors, considering the number of inhabitants and paying attention to sensitive buildings such as hospitals, schools, etc.

When drawing up the document, a sector boundary shall be considered as anything difficult to go through by an Assessment Team covering the area, such as railways, rivers or streams, large differences in elevation and so on, to minimize travel time in each sector.

It is essential that such a document shall always be available and ready to be used also when those who drafted it are not able to transmit it as required.

After strong seismic shocks, or major natural disasters, it may be impossible to reach the digital archives of the municipality concerned remotely via the Internet, so downloading the documentation and then using it to arrange a subsequent ASR2 shall be unlikely.

It may be appropriate at this point to have more backups of ASR1 plans of each territory kept in other more or less close locations, so as to allow the management staff to obtain the plans of the areas concerned in the shortest time and to prepare and organize the Assessment Teams in a relatively short time.

In order to obtain a First Rapid ASR2, it is advisable to identify local authority representatives who, following a natural disaster, based on the ASR1 plan, are definitely able to provide information about zones, areas and buildings within the sector requiring the creation of an ASR2.

### How the First Rapid ASR2 influences overcoming the barrier effect

A First Rapid ASR2 allows for a significant time reduction, as it enables the Assessment Team to be directed with the utmost precision, without losing precious time while inspecting areas that could potentially be "clean".

The difficulties encountered by an Assessment Team in travelling first through an affected territory are undeniable and there can be different types of important barrier effects as found in point 1 of the survey within the EASeR project, such as the collapsed infrastructure obstructing the affected areas, which is a problem that can be potentially solved if known. In fact, it is then possible for the Assessment Team to travel alternative routes, or, if necessary, fly by helicopter.

Allowing the Assessment Team to travel shorter distances at this stage is important in order to avoid all the other identified barrier effects that can be encountered while assessing the assigned sector.

#### *4.4.3. Communications & IT*

During an emergency, communications play a fundamental role, so it is crucial to maintain them even under extremely difficult conditions.

There are two typical cases, the former when the GSM network is available and the latter when the GSM network shall be missing.

If the GSM network is available, the assessment team can conveniently communicate and exchange data by using GSM mobile phones, tablets and routers. If the GSM network is absent, communications shall take place by using for example:

- satellite phones (Iridium voice only),
- vhf p3 radio by using the Fire Department's national frequencies
- bgan interfaced with smartphone/tablet for sending "simplified" forms
- bgan voice and data satellite modem.

The data collected during the ASR2 phase can be stored on tablets and be downloaded afterwards by the staff as soon as the GSM network is restored. The collected data may still be transmitted using:

- vhf p3 radio,
- satellite telephone,
- GPS device for reading the position coordinates.

#### *4.4.4. Incident and Whole Emergency Management*

The USAR Assessment Team, upon reaching the affected area shall:

- present itself before the relevant Operational Command point as indicated by the National Operations Centre,
- deliver the USAR Medium's Team factsheet,
- install the temporary USAR UCC/PC,
- ask for the level of completion of the ASR1 sectorisation (if carried out),
- contribute to the completion of the ASR1 sectorisation (if necessary).

The Assessment Team may receive the following instructions from the Operations Command point:

- to dispatch the assessment unit (structuralist and hazmat specialists) on site for the creation and/or completion of ASR2 (identification of operational sites),
- to be directly allocated to the operational site,
- to coordinate the USAR Medium Team present in the emergency scenario.

#### *4.4.5. New Technologies Dependency and Support*

##### Use of Prometheus within the USAR Assessment Team

As mentioned in the previous paragraphs, the experience of the Italian USAR teams led to the development of a software for managing information and flow of communications among the Assessment Teams.

More specifically, the Assessment Team is required to digitally fill up the "Worksite Triage Form" included in this software through Prometheus, in addition to the paper form, every time it identifies a place where the presence of survivors is ascertained or presumed.

The filled up form shall include all the information describing the Site, identifying the dangers, the type of collapse, the necessary resources, the number of allegedly missing victims, etc. In addition, the Assessment Team will prioritize the site (A, B, C, etc.).

The same form can also be used to send photos of the site, shape files and audio messages.

The data transmitted in real time to the UCC will provide a comprehensive overview of the sites where help is needed. All the ordered and filtered information shall be displayed on the monitor so that the UCC can quickly decide about the allocation of the most appropriate resources to each site.

In summary, digital transmission of all information shall allow to:

- avoid all barrier effects caused by road network problems (blocked roads, collapsed bridges, traffic, presence of bystanders, etc.)
- obtain details in real time
- draw on a single database that shall be automatically managed by the UCC for visualising the emergency situation, creating assignment forms, producing summary reports and creating updated maps with work in progress.

#### Use of Prometheus by the Usar Coordination Cell (UCC)

One of the main tasks of the UCC shall be to coordinate the teams and manage the resources deployed in the field. In order to carry out effective coordination, the UCC needs as much information as possible from the assessment and operations teams. It is important to stress that in order to save more lives, rescuers shall crucially exchange information as quickly as possible.

During their work, the Assessment teams shall continuously send out work site identification forms. Through the Prometheus platform, such data shall flow in real time and form a database that with appropriate display screens will allow showing open, working and closed sites. In this context, the dashboard, the database and mapping shall be essential tools for decision making.

The UCC shall then able to assign a team to a site simply by sending an assignment report that shall be automatically filled in by the System.

The operations team that shall receive the Assignment Package on its device, shall be able to see all the information collected by the Assessment team, including:

- site name
- geographical location
- boundary of the area
- No. missing persons and survivors
- priority
- photos of the area
- audio file with description by the assessment team
- gmaps navigator showing the fastest way to reach the place.

All the forms filled in by the teams (Worksite Triage Form, triage within site, report, victim extraction, factsheet, etc.) shall be available from the UCC in real time. Thus, during briefings the Coordination Cell shall be able to use sector summary reports that the system automatically shall draw up at regular intervals as set by the staff.

The continuous flow of data between Assessment, UCC and Operations Teams allows for the effective and correct emergency and resource management.

#### **Operations Teams**

##### Tasks

The task of the operations teams shall be to rescue and extract the largest number of victims as quickly as possible.

The team shall be assigned to a Site by means of an official document sent by the UCC including all the data collected during the Assessment.

The Team during its work, in addition to perform rescue operations, shall fill in some forms necessary for communication with the UCC, such as for example:

- Work site Report form
- Victim extrication
- Triage within site.

#### Use of Prométhéus By The Operations Team

As previously mentioned Prometheus includes additional forms that can help collecting information and coordinating help such as:

- Witness Interview
- Dead form
- Clear form.

#### Limits And Issues That May Stem from Using Technologies

##### Congestion and/or collapse of the Mobile Communication Network

A mobile telecommunications network allows telecommunications all over a territory divided into smaller areas called "cells", each served by a different telecommunications station.

During an earthquake or a large-scale emergency, the mobile network may be partially or totally damaged. In this case there shall be large areas which are not covered by the network thus resulting in no telephone communication and data transmission.

Another frequent problem that occurs during macro emergencies is congestion of the mobile network. Often, in fact, phone calls by the victims involved, by relatives trying to contact family members and rescuers exchanging information clog the network, thus preventing any type of communication.

#### Solutions

Radio communication remains the main means of communication for rescue teams, but when data have to be transmitted in whatever form they may be, the best platform is the mobile network. In the event of collapsed or congested mobile networks, the possible solutions for exchanging data shall be as follows:



## 1) Creating a Point-to-Point WiFi Bubble

It allows with special antennas to create an area of several kilometers radius (10-15 km) in which data and information can be exchanged.

At the same time, its great limit is that the point of transmission and of reception of the wifi signal must be optically visible one from the other.

### Advantages:

- WiFi technology allows for the transmission of large amounts of data,
- Signal stability.

### Disadvantages:

- bulky technology for an Assessment Team,
- difficult positioning of the data transmission antenna so that it can be picked up by the receiving antenna,
- Assessment Teams have to be equipped with a fixed antenna to be positioned and point exactly towards the WiFi receiver, thus making the team poorly dynamic.

## 2) Satellite Transmissions

It is possible to transmit the data generated by an Assessment Team and direct them to a UCC and vice versa, using a hotspot-type connection as a satellite phone.

### Advantages:

- easy and quick system set up
- easy to transport and compact
- guaranteed transmission in complete absence of any type of phone signal
- unlimited radius of coverage when outdoors.

### Disadvantages:

- transmitting a very limited volume of data
- significant cost of the satellite subscription
- in case of satellite transmissions, it shall not be possible to transmit photos of the sites and audio files.

### Using Drones

Using drones can be a real added value when addressing and solving some barrier effects. To this end, a joint preparation activity for both USAR Teams and SAPR pilots, with specific training and exercises, would achieve the goal of optimizing the interoperability and effectiveness of both resources if used during assessment and planning in case of a USAR intervention. As to the specific use of drones for USAR assessment, some of their characteristics, such as the rotary and/or fixed wing, in particular, can make them more or less usable:

- rotary wing drone: it can hover during flight and needs less space for take-off and landing, yet it has a shorter flight autonomy than the fixed wing but it withstands wind better

- ebee fixed wing drone: it has a greater flight autonomy than the rotary wing. It is mainly used for photogrammetric surveys of large areas. The charge of a battery is enough to guarantee a mission covering areas greater than 1000 x 1000 meters. Takeoff and landing require large distances of manoeuvre (about half a football pitch). Its harmless features make it compatible with flying in urban areas even in contexts of institutional activity, therefore not exclusively in rescue contexts.

Both types of drones use software that is planned and preloaded before the flight, allowing for programming the characteristics of the flight plan based primarily on the required data and other variables such as wind, sun exposure, flown over areas. As to data processing timing, according to current knowledge and conditions of use, high resolution shall involve a 3 or 4 hours processing delay before the results shall be provided to the assessment team, whereas with medium resolutions, the time is significantly reduced to 30 minutes. Such processing times shall depend on the characteristics of the PC processing the data and the number of shots.

The images, videos and photos are interconnected and can be uploaded with the Prometheus system via Bluetooth, improving the detail of the data transmission during the ASR2 assessment phase.

#### *4.4.6. Media Management*

The corresponding office within the National Operations Centre identifies and establishes a functional contact with the internal sources of information operating on site, comparing the data acquired with those available to the National Operations Centre.

Crossing the data ensures reliability of the message: the contents shall always be clear and safe, but especially during an emergency, backtracking is not allowed as it would make the Fire Department lose its reliability as a source of information, both for the media and for the affected populations. Once the message has been drafted, it is then shared with the Operations Leader onsite, to guarantee consistent content, as journalists' direct questions to the operatives cannot be ruled out. The Operations Manager

shall then inform the personnel about the line to be followed about evolving situations immediately, while about general situations during regular briefings.

The appropriate office of the National Operations Centre shall monitor press releases and inform the Operations Leader about any criticalities identified. The relationship between these two entities shall be continuous and dynamic, as both players have useful information for phrasing or rephrasing messages. It is through their contact that it will also be possible to ensure strategic control of interviews with the workers on site or remote spokespersons.

In some cases, in fact, especially in the early stages of an emergency, it is best to use a spokesperson to ensure uniformity, which also relieves the workers onsite as their statements can be legally binding.

In the most serious emergencies, the organization identified by the National Operations Centre can operate directly onsite, through communication staff and video operators, as a liaison between the Fire Department and the press.

#### *4.4.7. Use Of Air Vehicles / Helicopters And Generally Air, Land And Water Vehicles*

In case of mobilization by air of the Reconnaissance and Evaluation Team, transportation and travel of the Team during the operations shall be planned as well. For instance when using an air vehicle, the transportation of personnel and equipment from the airport to the operations area shall also be provided. It is also necessary to provide for the gas necessary for the generator used for setting up the UCC.

Even when using a helicopter, it may be necessary to make the final leg with ground vehicles, so in this case it shall be necessary to provide the transport of 7 people and about 180 kg of equipment.

The helicopter can be used for the Usar Assessment team also during the ASR2, when the assigned sector is not reachable by land or when it takes too long to reach it. It is unlikely that the helicopter shall be available to the USAR Assessment team for the entire duration of the ASR2, so that it shall be necessary to plan for the transportation of the personnel to return to the UCC or for reuniting with the Team later on.

The Crisis Room representative of the National Operations Centre will assess the most suitable means of transport to suit the assessment team's needs also after landing.

#### 4.4.8. *Activities Outsourcing*

While performing USAR Assessment, should the Assessment Team need resources (tools, equipment, vehicles, ....) that can only be obtained outside the Fire Department, it shall request them from the operations command it belongs to, specifying in detail the characteristics of what is needed and why.

## 5. INTERNATIONAL USAR

During the international deployment of the USAR Module and consequently of its assessment team, it is necessary to identify:

- the composition of the module, especially if it is based on other USAR modules present on the national territory,
- the modes of international activation (both at national and international level),
- how the early information about the requests of the affected country is collected and the response of the various international bodies,
- the phases of the USAR Module as to: warning, activation, deployment/mobilization and start of operations,
- training and education of personnel who can be part of the international module (possibly divided between USAR Light, Medium and Heavy modules and within them the various types of personnel).

It shall also be important to provide specific details about the following:

- the USAR assessment activity in an international context and the resulting differences in ASR operating levels,
- the definition of the operational site and its identification,
- the composition and tasks of the Assessment Teams,
- the working methods of the Assessment Teams and their interaction with the various national and international entities.

## 5.1. Preparedness

The preparedness phase is the period of operational standstill between two catastrophic events, i.e. between the end of a rescue mission and the beginning of a new one. In this phase, the USAR Assessment Teams, and USAR in the broadest sense, carry out a series of activities aimed at ensuring, in the event of activation, the state of maximum preparation and readiness for deployment.

### *5.1.1. Interaction With The Affected Population and Time Pressure*

Interaction with the population affected by the disaster is one of the most delicate aspects that a rescuer has to deal with during an emergency.

"Emergency" for a USAR Assessment Team is a term that encompasses a set of environmental conditions, closed and open unorganized spaces, blocked and exceptionally transformed roads and accesses, where a highly emotional and desperate atmosphere is aggravated by the size/time pressure of the urgent situation, increasing the interaction difficulties with the affected population. In certain contexts, the organisational response, in addition to the technical and professional skills, must have and use "emotional containment" skills, both with the victims in order not to further aggravate the distress of the affected person, and with themselves and their colleagues in order to facilitate the assessment work.

In addition, any language barriers given by the culture and dysfunctional communication with the players who are already on site can cause further stress, with possible misunderstandings, complications and operational delays.

In order to help USAR Teams with the interaction of different cultural habits, USAR Teams should be prepared and trained in cultural awareness aspects and it should be also very useful that National Operations Center or LEMA could prepare some information to hand over so as to avoid possible misunderstandings.

The purpose of emergency psychology is to study, treat and prevent psychic processes, emotions and behaviours that occur before, during and after critical events, but it teaches us that interventions in peritraumatic contexts involve and are mainly addressed to "ordinary" people, who are ordinarily reacting to a situation that, instead, is to be considered out of the ordinary.

In the preparatory phase for any emergency (Preparedness) and to deal with it effectively, primary prevention work shall be undertaken by informing and training on such topics with specific sessions, so as to make the rescuers not only sensitive but also aware and proactive about their own stress conditions and those of others.

### 5.1.2. *Communications & IT*

An effective communications system is essential for the safety and success of search and rescue operations. The communications system shall be developed to allow the transmission of information concerning search and rescue activities in urban areas in a national and international context in which the USAR module may be called upon to respond.

The architecture of the ITA HUSAR communications system shall be as follows:

- INTERNAL: communications on each worksite,
- EXTERNAL: communications between worksites, Command Post, USAR Coordination Cell – UCC,
- INTERNATIONAL: voice and data communications between BoO and/or UCC to the country of origin and/or to the European Response Coordination Centre – ERCC.

The Command Post, the UCC and the BoO can work in the same area.

In order to keep the above mentioned communication lines active at all times, the USAR ITA Team is equipped with the following equipment

Telephony. Using a phone allows to significantly cuts down transmission time and to have more articulated and clearer communications. There are several types of telephone systems that can be used by the H-USAR module during a mission:

- fixed telephony on the local PSTN network,
- GSM/LTE telephony,
- satellite telephony.

Bidirectional portable radio devices. The distribution of radio equipment may be subject to modifications due to the intervention needs of the module. Radio equipment shall use a frequency subject to modification according to the frequencies used and authorised in the affected country.

As regards the inventory for the management of all ICT material, an inventory file stored in a USB mass storage device while print outs are useful back-ups to be used in case of emergency.

The inventory database shall be updated in case of equipment reinstatement, removal or repair.

### *5.1.3. Incident and Whole Emergency Management*

All the activities resulting from the definition of roles and functions related to the barrier effect, Incident and Whole Emergency Management in the preparation phase, include planning the activities of the USAR Coordination Centre (UCC) and its interaction with the various Assessment Teams onsite during the emergency, more particularly as to decisional and communication flows.

### *5.1.4. New Technologies Dependency And Support*

This paragraph describes the technologies helping the team in locating the site where to provide assistance, which in the Italian experience are as follows:

- satellite receivers using GPS and GLONASS networks, shall be used for locating the module teams and for survey operations
- such receivers shall be able to navigate to a point, mark a point and record the track of the routes taken
- data export format shall be GPX
- the instrumentation provided, when drafting this document, is ETrex 30 by Garmin allowing for all the specific operations of a GPS for trekking such as navigation to and from a point, surveying and recording the position and routes taken
- sites shall be mapped by using the Information management tool application described in paragraph 5.4.4. The module also includes TAS 2 staff able, if necessary, to use powerful software such as Global Mapper, tested in national natural disasters and international missions for several years.

### *5.1.5. Media Management*

The personnel's required level of professionalism and the type of risk associated with USAR operations demand careful management of relations with the media, given their interest in the activities in question.

In case of the USAR Italy module, operating in international contexts, the management of communication becomes even more significant, taking into account the interaction with the international press and the need for coordination with LEMA, to ensure the dissemination of consistent data.

In case of deployment in international contexts, relations with the press on-site are managed by the Team Leader, or by an appointed representative appointed by such leader, in agreement with the communication manager of the National Operations Centre, with the cooperation of the management

and staff. All information disclosed to the public, must be communicated in advance to the chiefs of the various functional units of the team for dissemination to all members.

#### *5.1.6. Use Of Air vehicles / Helicopters And Generally Air, Land And Water Vehicles*

Upon reaching the emergency site, the USAR Module may ask and agree with the host country about the early arrival of the assessment team while the rest of the USAR team shall follow. To this end, the equipment of the Assessment Team can be adjusted according to the load capacity of the most appropriate type of transport to reach the epicentre of the disaster, selected on the basis of the information about the characteristics of the scenario and agreed with the host country.

The selection of such equipment is the result of lessons learnt during previous deployments, drills and retraining.

## 5.2. Activation & Mobilization

The mobilisation phase is the period immediately after a catastrophic event. The USAR teams prepare for deployment and respond appropriately to the demands of the affected countries.

With regard to management activities during the activation and mobilization phase, see paragraphs 5.1.5 e 5.1.6.

### *5.2.1. Communications & IT*

During Mobilization, it is important to verify the correct operation of all electronic instruments, more specifically as follows:

- checking and charging the batteries,
- connection check (router),
- tablet operation check,
- personal computer operation check,
- satellite telephones check and test,
- printer check,
- GSM phones charging and check,
- frequencies used and/or authorised in the affected country.



The personnel in charge of Communications and Data Transmissions shall require information about the condition of the communication infrastructures and networks in the affected area, the coverage of the networks above so as to be able to plan the operations and ensure the USAR Team's communications.

#### *5.2.2. Media Management*

It should be remembered that the relationship with the press also allows the team to acquire information on the ongoing disaster scenario. Therefore, in order to gather information, the team shall normally use:

- the VOSOCC platform,
- social media,
- newspapers' online sites.

For disseminating news to the press, within the Italian USAR Team, it is the Team Leader who works in coordination with LEMA and with the communication manager selected by the National Operations Centre.

It should be useful that planning of press conferences should be prepared and shared with USAR Teams as well as the other players involved in the Emergency in order to keep the line in the way of presenting the actual situation.

#### *5.2.3. Use Of Air Vehicles / Helicopters And Generally Air, Land And Water Vehicles*

##### Ground Mobilization

The choice of ground mobilisation depends on the distance. Except for some borderline situations where climatic factors or isolated locations to be reached require the use of other means, vehicles are essential both for approaching the heart of the disaster and assessing it, which shall be as methodical and rapid as possible.

During ground mobilisation, therefore, four wheel drive light vehicles under 35 quintals are preferable as they are suitable for all types of terrain and climate.

In some situations, it is important to have lighter vehicles such as quads, which are useful to overcome any debris caused by structural collapses and can be used in particularly restricted environments.

It shall also be essential to have a local driver, possibly a local staff member who is familiar with the road network, the areas, the points of interest, the potential hazards and the language and/or dialect used in the area of intervention.

When the Assessment Team is mobilised by land, the coordination during the first assessment phase can take place inside dedicated vans, if available, or if lacking, in light tents equipped with lighting, camping tables and chairs.

#### Mobilization Through Helicopters and Other Air Vehicles

In Italy, it is the Crisis Unit of the DPC (Italian Civil Protection Department) which shall:

- activate international deployment procedures (check of ICPD staff's passports and vaccinations, staff list and loading plan, VISA acquisition, authorisations, travel health insurance for all the staff of the Module), including the identification of a Chief of Mission and a Liaison Officer to support the USAR Module,
- through the Unified Air Operations Centre (COAU), collect information on available access points in the affected country. At the same time, it shall contact the Air Force to identify the most appropriate aircraft available according to the destination or contact a private broker for the use of a commercial airplane,
- through the Italian Embassy in the affected country, verify the availability of local vehicles and drivers for the subsequent transportation of the Module's personnel and equipment,
- in the case of deployment by land or sea, check the availability of vehicles with driver,
- contact the vaccination centre to check for any specific prophylaxis,
- in coordination with the Director playing the same role within the National Operations Centre, ensure that the Module is ready for departure at the POD within 6 hours.

The USAR FIRE DEPARTMENT Crisis Unit at the National Operations Centre shall take care of all phases under the scope of the National Fire Department in order to put together the team and the equipment and get them ready for departure.

In this phase, the TEAM LEADER or his or her designee shall continuously monitor the VOSOCC platform and enter the "mobilizing" status as to the H-USAR ITA Team.

### 5.3. Deployment

In the experience of the Fire Department Assessment Teams, it is not possible to identify a deployment phase as distinct from the activation and mobilization phases on the one hand and the beginning of operations on the other, for this reason there is no description of the barrier effects resulting from the deployment phase.

### 5.4. Operations

In this phase, it would be useful to describe the possible configurations of the Assessment Teams that can be operational in an international context.

In the Italian experience, there are two configurations, Complete Assessment Team (CAT) or Light Assessment Team (LAT), to be mobilized partially, with free operational choice between the two configurations or for intermediate configurations.

#### *5.4.1. Interaction With The Affected Population and Time Pressure*

During the impact phase (Operations), the rescuers of the Assessment Team shall be able to understand, check and drive the acute and intense emotional reactions, which can be potentially destabilizing in the midst of an evolving crisis, trying to manage them at best according to the various critical situations onsite. In the light of what was mentioned so far, it is evidently important to consider the human factor as one of the main barrier effects, in addition to the technical ones, mainly due to managing the nature and actions of all the players involved in the critical events, their behaviour and the psychosocial and inter-relational dynamics between them.

Therefore, it is important for the Assessment Team to acquire some non-technical skills or cognitive abilities (non-technical skills) such as, "communication" and "situational awareness", "teamwork", which is the ability to support collaborators/colleagues and resolve possible conflicts by exchanging functional information, as well as "stress management", which is ability to correctly identify any symptoms of stress, recognize its effects and implement the most effective strategies.

#### *5.4.2. Communications & IT*

The ICT specialist shall:

- obtain information relevant to the telecommunications regulations of the host country,
- programming the equipment according to the local frequency plan,

- assessing the optimal position for the location of the BoO, along with the Reconnaissance Team, to maximize the effectiveness of the communication system and cut down criticalities,
- distribute the equipment while using the appropriate forms,
- inform and train workers about using the equipment correctly,
- guarantee, during demobilisation, the recovery and maintenance of the equipment by means of the appropriate forms,
- inform and train workers about correctly using the equipment,
- guarantee, during demobilisation, the recovery and restoration of equipment, taking care of complying with transport procedures.

It shall also be useful to identify the radio communication and data transmission procedures.

#### *5.4.3. Incident And Whole Emergency Management*

The USAR Assessment Team, upon reaching the affected area shall:

- register the team by Briefing with OSOCC/UCC (or by setting up and managing UCC on request by NEMA/LEMA),
- meet with NEMA/LEMA,
- if it is the first team to reach the affected area, on request by LEMA, to prepare and manage the RDC and / or UCC,
- implement operations in compliance with INSARAG guidelines,
- coordinate its activities with LEMA, OSOCC and UCC,
- attend OSOCC meetings regarding USAR operations,
- regularly update data on the VOSOCC platform,
- keep LEMA up to date on the activities through VOSOCC,
- set up the BoO (Base of Operations),
- ask for the extent of completion of the ASR1 sectorisation (if carried out),
- contribute to completing the ASR1 sectorization (if necessary).

Possible directives by LEMA, OSOCC and UCC:

- to dispatch onsite the assessment unit (structuralist and hazmat) for realizing and/or completing the ASR2 (identification of operational sites),
- to be allocated directly to the operational site,
- to coordinate the USAR Medium teams present in the emergency scenario.

#### *5.4.4. New Technologies Dependency And Support*

##### GPS and Mapping

This paragraph shall include the equipment used to locate the module teams and survey operations, which in the Italian experience, are satellite receivers using GPS and GLONASS networks.

They must be able to navigate to a point, mark it, and record the routes taken while the data export format will be in GPX.

The instrumentation provided, when writing this document, is ETrex 30 by Garmin that allows for all the specific operations of a GPS for trekking use such as navigation to and from a point, survey and recording the position and routes taken.

Sites shall be mapped with the "kobo toolbox" application as described below. The module also includes TAS 2 staff able, if needed, to use powerful software such as Global Mapper, tested in national natural disasters and international missions for many years.

##### Kobo Toolbox

The Kobo toolbox software, (<https://kc.humanitarianresponse.info/projectname>) shall be used by the UCC for detecting the teams involved in the incident scenario as well as for assessment needs. The application can be used both through the dedicated app for Android and through the iOS systems modules, which can be downloaded from the vOSOCC website (<https://vosocc.unocha.org>) in the section opened for the emergency. Mapping shall be carried out by means of the kobo application in the GPS Points dedicated section.

The software will allow to:

- create thematic maps,
- record and visualize georeferenced data coming from the sites in a map,
- create georeferenced maps,

- print maps.

### Tablet

The communication system shall allow to use the tablets with Android interface provided for collecting and transmitting the information both during the Assessment phase by the Structural Engineers and during the operational phase by the Crew Leaders of the operations teams involved in the worksites.

The tablets will be equipped with a SIM card enabled for international data traffic and dedicated rescue applications including the Kobo Toolbox app.

#### *5.4.5. Media Management*

It should be remembered that the press and media are sources of information for the team on the current emergency scenario. Therefore, to acquire such information, the team shall employ, in the Italian experience:

- VOSOCC platform,
- social media,
- online sites of the newspapers.

For the dissemination of news to the press, the Team Leader shall work in coordination with LEMA and the contact person of the National Operations Centre. To this end, the channels normally used shall be:

- interviews given by the Team Leader or by his or her appointee,
- press releases by e-mail
- official social networks of the National Fire Department.

In order to effectively communicate the consistency, composition and purpose of the USAR module in an emergency scenario - the Liason Officer prepares a press pack to be distributed to the press before departure. The document shall contain at least the following information:

- composition of the USAR module,
- purpose of the Mission,
- analysis of the situation and request for international aid,
- brief description of the Union Civil Protection Mechanism,

- websites for further information on the Usar Module,

At the end of the operations onsite, if deemed appropriate, the team, in coordination with LEMA or OSOCC, shall inform the press about it and about its departure.

#### Gathering Information

The Team Leader shall collect updated data on the module's operational activities and subsequently disseminate them to the press and the media.

To this end, briefings must be planned at regular intervals with the following persons:

- RDC manager,
- UCC manager,
- PO and OP.

Data shall be processed by the team's staff in a summary form and shall also be used for transmitting reports to the National Operations Centre.

#### *5.4.6. Use Of Air vehicles / Helicopters And In General Air, Land And Water Vehicles*

In cases of air mobilization of the Reconnaissance and Assessment Team, it is necessary to plan for the transportation and travel of the Team also during the operations.

For example, when using an aircraft, the transportation of staff and equipment from the airport to the operations area must be provided as well. It is also necessary to plan for the supply of gas for the generator used for setting up the UCC.

Even when using a Helicopter, it may be necessary to travel the final leg by ground vehicles, thus it will be necessary to organize the transport of 7 people and about 180 kg of equipment.

The helicopter can be used for the Usar Assessment team also during the ASR2, when the assigned sector is not reachable by land or it takes too long to do so. The helicopter shall be unlikely available to the USAR Assessment team for the entire duration of the ASR2, so the personnel's transport back to the UCC or for subsequent reunification with the team shall be planned.

Local or national authorities shall evaluate the most suitable means of transportation for the Assessment Team's needs and transport after landing. Local or national authorities shall provide, if possible, preprepared information about road conditions and traffic regulations for incoming USAR Teams possibly through VOSOCC.

#### 5.4.7. *Activities Outsourcing*

Should the Reconnaissance and Assessment Team, during the USAR Assessment activities, need resources (tools, equipment, vehicles,...) that can be found only outside the team members, it shall request them to the local or national authorities during the appropriate meetings and specify in detail the characteristics of what is needed and why.

## 6. Post Mission / Lessons Learnt

### Demobilization

The Team, upon being informed that the operations are nearing completion shall:

- notify the National Operations Centre about any needs linked to demobilisation operations,
- provide complete documentation to the OSOCC, UCC or RDC prior to departure.

If possible and after consultation with the National Operations Centre, the Team shall then become available, for other humanitarian operations, such as:

- supporting larger humanitarian relief operations when the USAR phase is over,
- structural engineering assessments,
- medical assistance.

At the end of the activities, the Team in agreement with the Chief of Mission, shall consider donating a part of the equipment to the assisted government, as provided for in the specific administrative procedure.

The return to the headquarters, in coordination with the OSOCC, shall be arranged in agreement with the Chief of Mission of the USAR Team.

After the team has left the affected area, the Team Leader or any appointee, shall enter "Mission Completed" in the VOSOCC platform for the specific USAR Team.

### Post Intervention

In the Italian experience, upon returning from the operational mission, the Team Leader in collaboration with the national reference person of the USAR sector, shall organize, as soon as possible, a debriefing with all the chiefs of the functional units, the USAR module management and the



components of Civil Protection Department that took part in the mission, to analyze any problems and criticalities that emerged during the operations, to verify the validity of the adopted procedures and to share ideas for improvement.

The Team Leader shall be responsible for sending a "Post-Mission report" to the INSARAG Secretariat within 45 days after returning from the mission.

The National Operations Centre shall organize a peer-to-peer psycho-social support meeting involving the USAR operators who were deployed.

The staff of the module, according to its organization and under the coordination of the Regional Contact Officer, shall contribute to verify the equipment status and efficiency, the materials and devices, providing for anything necessary as well as the restoring everything in full operating conditions, and getting immediately ready for a subsequent mission.

## 7. Annexes / Reference Documents

Annex no.1 Assessment Team Training Programme

Annex no. 2 Equipment variant of the Assessment Team's Backpacks

## 8. List Of Abbreviations

ACLS	Advance Cardiovascular Life Support
ASI	Italian Space Agency
ASR	Assessment Search and Rescue
ASR1	Wide Area Assessment
ASR2	Sector Assessment
ASR3	Rapid Search and Rescue
ASR4	Full Search and Rescue
ASR5	Total Coverage Search and Recovery
BLS	Basic Life Support and Defibrillation
BoO	Base of Operation
CECIS	Common Emergency Communication and Information System
DPC	Italian Civil Protection Department
PPE	Personal protective equipment
ENAC	Italian Civil Aviation Authority
ENAV	Italian air navigation service provider
ERCC	Emergency Response Coordination Centre
GSM	Global System for Mobile Communication
HAZ-MAT	Hazardous Material
IAP	Incident Action Plan
ICS	Incident Command System

INSARAG	International Search And Rescue Advisory Group
LEMA	Local Emergency Management Authority
NEMA	National Emergency Management Authority
PBLSD	Pediatric Basic Life Support and Defibrillation
PDF	Portable Document Format
POD	Point of Departure
RDC	Reception Departure Centre
SAPR	Acronym for Drones
SAR	Search and Rescue
SOP's	Standard Operating Procedures
TAS	Topography Applied to Rescue
UCC	USAR Coordination Cell
UHF	Ultra high frequency
UN OCHA	United Nations Office for the Coordination of Humanitarian Affairs
USAR	Urban Search and Rescue
UWP	Universal Windows Platform
VHF	Very High Frequency
VOIP	Voice over IP
VOSOCC	Virtual OSOCC
WiFi	Wireless Fidelity
OSOCC	On-Site Operations Coordination Centre



## Annex no.1 Assessment Team Training Programme

Day 1				
Schedule	Module	Mode	Expert/s	Training goals
8.30 – 8.45	Course Introduction	Presentation		Understanding the contents of the course, its organisation and general goals
8.45 – 9.15	Barrier effects during the USAR assessment activity and link with the EASER project	Presentation/Video		Knowing the contents and the goals of the project which allowed to organise the course
9.15 – 10.15	Italian Operating Procedures (SOP) to deal and resolve barrier effects in the course of the USAR assessment	Presentation and Q&A		Understanding settings and goals of the Italian Standard Operating Procedures
10.15 – 10.30	BREAK			
10.30 – 11.15	ASR operating levels and assessment	Presentation		Getting to know the ASR operating levels and the role played by all parties involved in assessment activities.



11.15 – 12.00	Reconnaissance and Assessment	Presentation		Being aware of the composition and role of the reconnaissance and assessment team members
12.00 – 12.15	BREAK			
12.15 – 13.00	UCC (Part I): role and tasks	Presentation		Getting to know more thoroughly roles and tasks of the USAR Coordination center
<b>13.15 – 14.15</b>	<b>LUNCH BREAK</b>			
14.30 – 15.15	UCC (Part II): paper forms	Presentation		Being able to use the forms of the USAR Coordination Center
15.15 – 17.15	UCC set-up	Exercise <i>Table top</i>		Setting up the UCC and managing the forms
17.15 – 17.45	De-briefing	Q&A	All	Analysing possible criticalities and improvements
18.00 – 19.00	Psycho-social impact, stressors analysis	Presentation + Role playing	All	Learning practical skills for better stress management
<b>Day 2</b>				
<b>Schedule</b>	<b>Module</b>	<b>Mode</b>	<b>Expert/s</b>	<b>Training goals</b>
8.30 – 9.30	“Prometheus” management system	Presentation		Understanding features and application potential of Prometheus
9.30 – 9.45	BREAK			
9.45 – 12.45	“Prometheus” and ASR2 (Part I)	Table top Exercise	All	Learning to use “Prometheus”
<b>13.00 – 14.00</b>	<b>LUNCH BREAK</b>			



14.15 – 16.00	“Prometheus” and ASR2 (Part II)	Operations Exercise	All	Learning to use “Prometheus”
16.00 – 16.45	Drones: general aspects	Presentation		Knowing features and application potential of drones
16.45 – 17.15	Drones: during USAR assessment	Q&A	All	Learning operating details on the use of drones during USAR assessment
17.15 – 17.45	De-briefing	Q&A	All	
18.00 – 19.00	Self-evaluation and stress management	Presentation + Exercise	All	Learning practical skills for better stress management
<b>Day 3</b>				
Schedule	Module	Mode	Expert/s	Training goals
8.30 – 9.30	Personal equipment	Presentation		Knowing the personal equipment of the assessment team
9.30 – 10.30	Interaction with local authorities and first responders	Presentation and case studies		Understanding the interaction between local authorities and first responders
10.30-13.00	Operating procedures: application	Operating exercise	All	Acquiring a profound knowledge of the procedures through their operating application
<b>13.00 – 14.00</b>	<b>LUNCH BREAK</b>			

14.00 – 17.00	Debriefing	Q&A	All	Clarifying doubts about procedures
<b>Day 4</b>				
8.30 – 9.30	The air vector in the Fire Department rescue system	Presentation		Getting to know more thoroughly the general and peculiar features of the air vector included in the Fire Department rescue system
9.30 – 10.15	Flight missions: elements for planning	Presentation		Getting to know the procedures and factors concurring to plan the flight missions with special reference to limitations
10.15 – 10.30	<b>BREAK</b>			
10.30 – 12.30	Mission planning practical tests	Workgroups		Improving mission planning
<b>13.00 – 14.00</b>	<b>LUNCH BREAK</b>			
14.00 – 15.00	Helicopter boarding procedures	Practical activities		Getting to know the staff and equipment boarding on the aircraft with special reference to limitations
15.00 – 16.00	Ground practical activities: staff and equipment boarding and unloading	Exercise		Becoming familiar with the boarding operations



16.00 – 17.00	Self-rescue procedures and evacuation by hoist	Exercise		Becoming familiar with land-onboard signaling procedures and of rapid evacuation through assisted hoist
17.00 – 17.30	Debriefing	Q&A	All	Clarifying doubts about the procedures
<b>Day 5</b>				
8.30 – 9.30	Pre-operating briefing and provision of training mission	Practical activity		Be ready for the mission
9.30 – 11.30	Training mission	Practical activity		Becoming familiar with the boarding/landing procedures from an aircraft and rapid evacuation in case of emergency
11.30 – 12.15	Final session and general assessment (oral)	Q&A	All	Assessing the course and its components (strengths and possible improvements)
<b>END OF COURSE and FAREWELL</b>				







## Annex no.2 Equipment variant of the Assessment Team's Backpacks

<b>CONTENTS OF THE ASSESSMENT STRUCTURE SPECIALIST'S BACKPACK</b>	
1	Motorola UHF Radio DP 4801
1	Motorola Radio Spare Batteries
1	Motorola Radio Battery Charger
1	Flash light + 54V Battery + Charging Base
1	Domestic Fire-fighters VHF Radio Frequencies
1	5 mt Pocket Size Measuring Tape
1	Laser Measuring Tape
1	Orange Paint
1	Powerbank 18K
1	eTrex 30 GARMIN GPS + spare batteries
1	Whistle
1	Tablet + sim card with pre-loaded forms
1	Smartphone
1	Satellite Phone
1	Folder containing INSARAG paper forms + stationary
1	High Visibility Multi Pocket Vest
1	Caution tape
1	Cigarette lighter plug charging cable

<b>CONTENTS OF THE NBCR ASSESSMENT PACKBACK</b>	
1	Motorola Atex Radio
1	Spare battery for Atex Radio
1	Battery charger for Atex Radio
1	UDR13
1	Complete MSA Altair 5x Explosimeter
1	Red caution tape
1	Large tip permanent marker
1	Cat. III Tipo IV Size XL Overalls
1	FFP3Oronasal mask
1	Dust filter
1	Butyl gloves
2	Disposable gloves
1	Whistles alert system
1	High visibility multi pocket vest

<b>CONTENTS OF THE ASSESSMENT COORD. BACKPACK 1</b>	
1	Coordination PC Notebook
1	PC cables and accessories
1	100 W 12 /220 V inverter with cigarette lighter connector
1	18 K Power bank
1	Battery operated A4 printer
1	Router + Sim Card
1	Smartphone
1	Domestic Fire-fighters VHF Radio Frequencies
1	UHF Radio
1	Radio with aviation frequencies
1	Tablet
1	Satellite phone

<b>CONTENTS OF THE ASSESSMENT COORD. BACKPACK 2</b>	
1	Board support easel
1	Roll up boards
1	Stationary for boards
1	General stationary
1	INSARAG paper forms
1	Multi-plug adapter + 10 mt cable
1	PVC board display

<b>TEMPORARY ADVANCED LOGISTICS</b>	
1	22 kilos tent bag
1	Camping roll up table
2	Camping stools
1	15 kilos lighting case with 12 V output