

Research activities within European Union research program for improving preparedness and resilience

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Introduction

The International Emergency Management Society (TIEMS) is an international not for profit non-profit organisation, registered in Belgium, operating in its 26th year. TIEMS has chapters in 14 countries around the world and is in the process of establishing three new chapters this year. TIEMS activities comprise international conferences and workshops; research and development activities; and education, training and certification programs. TIEMS's slogan is: Preparedness saves lives.

Since 2006 TIEMS has participated as a consortium partner in European Union (EU) Research and Technology Development (RTD) programs to improve emergency preparedness. In addition, TIEMS experts have been members of user groups and advisory boards for a variety of other EU projects focusing on preparedness in Europe and worldwide. The present running EU program is Horizon 2020, which will have invested more than 100 billion Euro in RTD by the end of 2020, by EU RTD funding and private investment.

Four EU projects where TIEMS has been a consortium partner are: NARTUS (addressing important public safety communication issues); ASSET (improving trust between authorities and the public for pandemics and epidemics); HERACLES (protecting cultural heritage sites towards climate change), and DG ECHO Wildfire HUB (establishing an expert HUB in Europe to support wildfire fighting and to serve as a prototype for additional expert HUB's for other disasters in Europe). This paper summarizes the approaches developed by these programs to improve emergency preparedness.

TIEMS has also launched its own internal RTD project to develop a curriculum and on-line system for TIEMS International Certification – TQC, which aims to become an internationally recognised certification of qualifications in international emergency management. This paper describes the structure and operational aspects of TQC.

Horizon 2020

Horizon 2020 is the biggest EU Research and Innovation program ever in EU with nearly €80 billion of funding available from EU over 7 years (2014 to 2020) – in addition to the private investment that this money will attract. It promises more breakthroughs, discoveries and world-firsts by taking great ideas from the lab to the market. Seen as means to drive economic growth and create jobs, Horizon 2020 has the political backing of Europe's leaders and the Members of the European Parliament. They agreed that research is an investment in our future and so put it at the heart of the EU's blueprint for smart, sustainable and inclusive growth and jobs.

By coupling research and innovation, Horizon 2020 is helping to achieve this with its emphasis on excellent science, industrial leadership and tackling societal challenges. The goal is to ensure Europe produces world-class science, removes barriers to innovation and makes it easier for the public and private sectors to work together in delivering innovation.

Horizon 2020 is open to everyone, with a simple structure that reduces red tape and time so participants can focus on what is really important. This approach makes sure new projects get off the ground quickly – and achieve results faster (EU RTD program, Horizon 2020).

NARTUS

The first EU RTD project TIEMS participated in as a partner was the NARTUS project, in the period 2006 - 2009. It was financed within the FP 6 framework EU program.

The NARTUS project was focused on creating a European Public Safety Communication Forum with the aim of establishing a European platform and roadmap for future public safety communication to help to facilitate European integration in the area of Public Safety with particular focus on public safety communications and information systems. The European Public Safety Communication Forum was to include Conferences and other activities between the Conferences, designed to be interactive and consultative with public safety

users, system providers and operators in as many European nations as possible.

Through the Forum Conferences and other consultative mechanisms, NARTUS should not only establish consultation processes and build consensus, but also disseminate information, best practice and establish protocols through which it would be able to provide advice to policy makers and influence the development of standards for the benefit of public safety in Europe (NARTUS project Facts, 2009).

The project result was establishment of the Public safety Communication Europe Forum, or PSCE. Since its establishment, PSCE has evolved into an independent forum, where representatives of public safety user organisations, industry and research institutes can meet to discuss and exchange ideas and best practices, develop roadmaps and improve the future of public safety communications.

PSCE is a permanent autonomous organisation, working to foster excellence in the development and use of public safety communication and information management systems by consensus building (Public Safety Communication organization, 2019)

HERACLES

The HERACLES (2016 - 2019) project's main objective were to design, validate and promote responsive systems/solutions for effective resilience of CH (Climate Change) against climate change effects, considering as a mandatory premise an holistic, multidisciplinary approach through the involvement of different expertise's (end-users, industry/SMEs, scientists, conservators/restorers and social experts, decision, and policy makers). To this end, the project developed an ICT platform able to collect and integrate multisource information in order to effectively provide complete and updated situational awareness and support risk assessment and decisions on building CH resilience by developing new solutions for mitigation actions.

The HERACLES solutions are flexible and can be changed and tailored to the specific CH assets needs, guaranteeing in that way a general applicability. A fundamental role was to be

played by end-users, which actively contributed to the project activities: the state institution that takes care of Greek CH in Crete, the Minoan Knossos Palace and the Venetian coastal monuments and municipality of Gubbio, a medieval city in Italy, taking care of historical monumental in the town (palace and walls). The locations were carefully selected in order to represent the monuments, which are evidently under influence of the effects of climate change that would endanger their safeguard.

The solution is based on comprehensive diagnostic and analytical protocols and risk assessment methodology (HERACLES project, 2019).

Diagnostic and analytical protocols have been developed and are at the basis of the HERACLES best practices. These protocols cover three types of activities:

- Comprehensive site strategies;
- Quick assessment strategies;
- Laboratory Analysis.

This strategy exploits sensors and techniques/methodologies that investigate the CH assets also by looking to the surrounding areas, as well as the building structures and their constituting materials. This comprehensive vision is carried out by means of satellites and airborne sensors, in-situ sensors and material characterization methods by using a multi-scale multi-resolution strategy. A large set of sensors (satellite, airborne and in-situ) are employed to assess the risk context, the structural state and the environmental factors affecting the test-beds. These sensors acquire information on the structural and environmental conditions around the asset, which represent the input to the ICT platform as well as to the models developed in the HERACLES project. At the same time, specific information on the physico-chemical properties of the involved materials are acquired through a number of portable (in-situ) and laboratory analytical techniques (ex-situ).

Risk assessment methodology is conceptually presented with the following basic expression:

$$\text{Risk} = \text{Vulnerability} \times \text{Exposure}$$

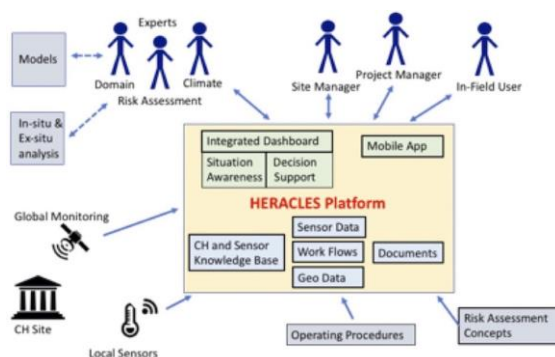


Figure 1: Pictorial view of the HERACLES Platform (HERACLES project, 2019).

The methodology supports multi-hazard evaluation and values of both vulnerability and exposure are assessed based on five categories: Very Low, Low, Medium, High and Very High. Vulnerability is estimated as the probability of risk, while the socioeconomic impact functions as the exposure variable. The methodology considers long-term risk assessment that is based on impacts calculated using models and future climate change conditions (winds, precipitations, etc.), thus leaving enough time for mitigation actions.

The HERACLES users interact with the ICT platform through the Integrated Dashboard and the Mobile App (Figure 1). The functions performed by users through interaction with the ICT platform include:

- Visualisation of data collected at CH sites from various sensors;
- Visualisation of results produced by models and other analysis (modelling and analysis are carried out external to the ICT platform, whereas the corresponding results feed the platform);
- Generation and review of alerts and other messages and communication with mobile devices;
- Generation and tracking of workflows representing the steps, work requests, and information flows associated with HERACLES Operational Procedures;
- Creation, management and retrieval of reports requested by Site Managers and produced by Domain, Climate, and Risk Assessment Experts through their analyses;
- Creation, management and retrieval of a Knowledge Base of information about CH sites and information about them created through HERACLES Operational Procedures.

The HERACLES operational procedures’ framework for disaster prevention, risk mitigation and management is developed to

help end-users to operate the relevant functionalities of the HERACLES Platform in terms of situation assessment as well as information and decision support. The procedures are designed to be generic, so whoever will use the HERACLES Platform’s functionalities may use them and additionally customize to a particular CH asset.

The HERACLES operational procedures’ framework is organised according to the following actions:

- Monitoring and management – monitor and document the preservation state of the site, factors affecting the site, and develop procedures for CH risk management;
- Threat identification – identify potential climate change induced threats/hazards that may impact CH site health;
- Threat assessment – perform in-situ or ex-situ analysis, or run CH health related models as required and determine if there is a need for a risk assessment;
- Vulnerability as a part of risk assessment – assess vulnerabilities for individual hazards and overall vulnerability of CH site in a multi-hazard scenario;
- Exposure assessment as part of risk assessment – assess exposure based on socio-economic impacts including economic and non-market factors;
- Risk assessment – assess risk based on vulnerability and exposure;
- Mitigation – develop and carry out a mitigation plan through a cooperation among Site Manager, Domain Experts and Project Manager.

Figure 2 shows how HERACLES solutions: Diagnostic and Analytical Protocols, Operational Procedures and ICT platform are mutually connected.

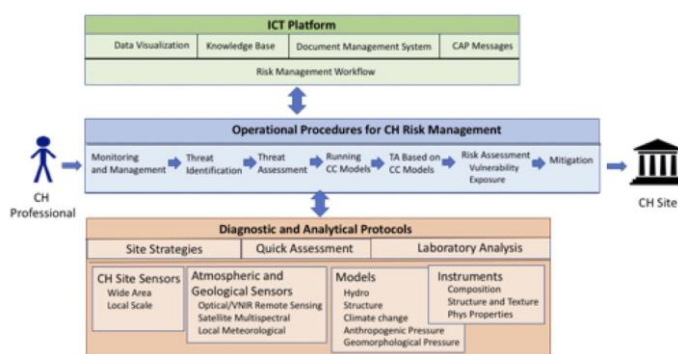


Figure 2: Unified framework of Diagnostic and Analytical Protocols, Operational Procedures and ICT platform (HERACLES project, 2019).

Network of European hubs for civil protection and crisis management

The objective of this on-going project (February 2019 - to February 2020) is to formulate a concept and a model for European hubs for civil protection and disaster management. The idea is to build a generic concept of civil protection hub, which will ensure an optimum use of the disaster management knowledge and expertise that exists in Europe, through its further integration into existing practice. Within the scope of the project, a series of concrete activities will be designed to test the feasibility and adequacy of the proposed concept. The activities will result in a pilot hub on wildfire risk management. Based on the experiences of the wildfire pilot hub, a generic hub-model will be proposed to provide guidance for a potential future initiative of the UCPM participating states (European Union Civil Protection Mechanism, 2019).

The project is a part of the Preparatory Action 'European Hubs for Civil Protection and Crisis Management', and was adopted by the European Parliament to support the disaster preparedness in the Union and its Member States in the framework of the Union Civil Protection Mechanism (UCPM) and to better tackle the new challenges posed by the changing risk landscape in Europe. Preparatory actions and pilot projects are initiatives of an experimental nature designed to test the feasibility and usefulness of actions and to prepare new actions like EU policies, legislation, and programs. They are meant to try different approaches, develop evidence-based strategies to address a problem, identify good practices, and provide guidance for possible future initiatives. As such, the preparatory action 'European Hubs for Civil Protection and Crisis Management' is an opportunity to explore the concept of hubs for civil protection and to propose a theoretical model for the development and setting up of such hubs. The Commission, in close cooperation with the participating states, will then decide whether and how to implement this theoretical model. For this reason, the project will help the Commission to assess the feasibility and relevance of the creation of hubs for civil protection (EU DG ECHO Tender, 2018).

So far, the research shows that there is a long-list of potential hub activities may be clustered along the hub's specific objectives:

- Implement and coordinate training and exercises;
- Enhance exchange of knowledge;
- Promote interoperability;
- Policy advice, advocacy and awareness raising.

The hub shall be a neutral body with no own (strategic, political or commercial) interest. It shall be independent, open and accessible to all stakeholders that might have an interest to be connected to it. The hub shall (through a high-level Governing board) support, stimulate, promote and connect existing initiatives (for example national initiatives as, non-

profit initiatives as or for example training centres and school and research institutes and the actual civil protection agencies). It shall not duplicate or compete with what is currently there and being developed. As such, the hub shall provide support to bottom-up initiatives and activities, as well as strengthening the EU Civil Protection Mechanism programmes.

In order to meet the above-mentioned objectives and to implement the suggested activities the hub will have virtual components (in particular related to exchange of knowledge objectives) as well as 'non-virtual' components.

The project will also provide training courses and recommendations for a common command and coordination framework.

ASSET

The 2009 H1N1 influenza pandemic revealed a breakdown in the communication between decision makers, their scientific institutions, and the European public. This communication failure led to unwanted effects, such as the failure of a large part of the population to adopt adequate preventive measures, and the scientific sector not taking into account important information coming from the population. The objective of ASSET (Action plan in Science in Society in Epidemics and Total pandemics) was to create a blueprint for a better response to pandemics, through improved forms of dialogue and better cooperation between science and society at various stages of the research and innovation process. ASSET was a four-year, European Commission funded Mobilization and Mutual Learning Action Plan (MMLAP) project, which started 1st January 2014 and ended on 31st December 2017. ASSET was funded through the European Union's Seventh Framework Program, the predecessor to the Horizon 2020 program (ASSET project, 2017).

The ASSET project objectives were to:

- Forge a partnership with complementary perspectives, knowledge and experiences to address scientific and societal challenges raised by pandemics and epidemics, and associated crisis management;
- Explore and map SiS (Science in Society) related issues in pandemics and epidemics;
- Define and test a participatory and inclusive strategy to improve bi-lateral communication aimed to succeed with crisis management;
- Identify necessary resources to make sustainable the actions after the project completion.

ASSET activities

ASSET activities are summarised in Figure 3.



Figure 3: ASSET Activities (ASSET project, 2017).

The project began with an examination of five key issues at the interfaces between officials, experts, and the general public:

- Governance - the roles of national and international health organizations in the 2009 pandemic were reviewed, with a particular focus on causes of lack of trust, and perceived conflicts of interest. Experience with participatory governance, state-sanctioned institutional processes that allow citizens to exercise voice and vote, was reviewed and analyzed for applicability to pandemics;
- Open Science - unsolved scientific questions related to pandemics were reviewed, and a roadmap was developed for responsible, open, citizen-driven research related to pandemics;
- Ethics - ethics, law, and fundamental rights implications of pandemics were examined, including issues such as protection of personal autonomy versus public good, informed consent under emergency circumstances, stigmatization, resource allocation, preventions versus treatment, and human rights;
- Gender Equality - gender difference implications were examined with respect to infectious disease exposure, access to information on and use of vaccinations, and research protocols;
- Bioterrorism - governance problems associated with intentionally caused outbreaks were reviewed, with a focus on the tension between secrecy and transparency, freedom of research and security, and citizen involvement in expert's decisions.

From this research, an action plan was developed in conjunction with citizen consultation. Elements of this plan were developed and exercised during the rest of the project, with the intent that they would inform future pandemic response after the project was completed. Plan elements were developed and carried out during the project included

- Prototype initiatives to support preparedness and response to pandemics, including social media mobilization, a Best Research Practice Platform, a Stakeholder Portal, and Local Initiatives to experiment with various forms of multi-way communications between officials, experts, and the public;

- A High-Level Policy Forum that brought together selected European health policy/decision makers from 12 different countries (Bulgaria, Denmark, France, Greece, Ireland, Israel, Italy, Luxembourg, Norway, Romania, Sweden and United Kingdom) in a continuing dialogue to promote on-going reflection on European strategic priorities and challenges for tackling pandemics;
- A wide variety of communications mechanisms to connect and inform pandemic stakeholders, including electronic and traditional publications, a media presence, summer schools, conferences, and a Best Practice award to focus attention on the key role played by general practitioners in pandemic response.

ASSET handbook and toolbox

The ASSET Handbook and Toolbox were developed as a project legacy to support practical implementation of the project's findings, as shown in Figure 4.

The intended Handbook audience includes the full range of stakeholders concerned with pandemic preparation and response: authorities, healthcare professionals, scientists, industrialists, media, and of course the general public. The handbook describes the instruments developed by ASSET to support all stakeholders in establishing a trusting, collaborative, effective response to pandemics.

The ASSET Toolbox supports the application of the Handbook instruments by providing ready access to reference information, guides, templates, and training materials.

Key recommendations from ASSET citizen consultations

ASSET convened eight Citizens' Consultations in as many European countries (Bulgaria, Denmark, France, Ireland, Italy, Norway, Romania, Switzerland), simultaneously, carried out on 24th September 2016, asking 425 citizens questions relevant to preparedness and response during epidemics, pandemics or in general PHEIC (Public health Emergency of International Concern). A comprehensive report of the results of the citizen consultations cited the following main conclusions:

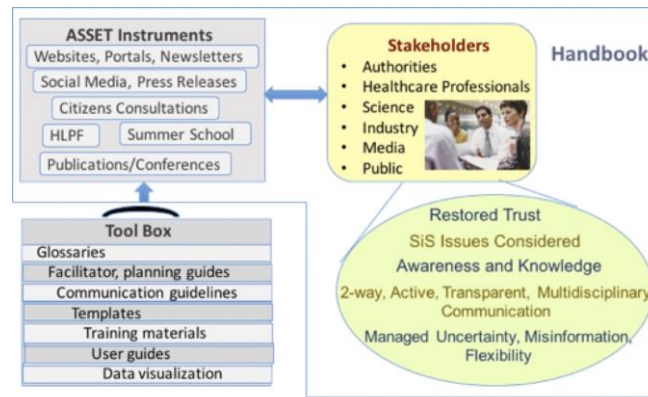


Figure 4: ASSET Handbook and Toolbox support project legacy (ASSET project, 2017).

- Risk Communication - Citizens believe that developing honest, clear and transparent communication can restore and further increase the public trust (no matter how bad the situation is). They think it is their right to know and understand occurrences;
- Trustable Sources - General practitioners and health professionals should be trained to adapt to changing society, and decision makers should be urged to be visible and present on the web, as the use of Internet is increasing;
- Ethics - In emergency situations, public health interest should take precedence over individual freedom;
- Vaccination - Informational materials for vaccination needs to be updated, clarified and standardised, especially considering particular target groups, such as pregnant women and the elderly;
- Participation - Public health authorities should devote more resources to collecting citizen input on policies for epidemic preparedness and response.

TIEMS participation in other EU RTD projects

As TIEMS is an international organization with chapters in 14 countries, it has established an international Group of Experts, TIGE (TIEMS International Group of Experts 2018), comprising TIEMS Directors and Officers from TIEMS International Board and from each of the Chapter Boards, forming a group of more than 100 international experts from more than 25 countries, and with different background, education and experience. This unique expert group will be called upon, when TIEMS is invited to be a member of advisory boards and user groups or other reference groups in running EU RTD projects.

So far TIEMS has participated as referenced experts in the following EU projects: ACRIMAS, OPTI-Alert, Archimedes, CRISMA, DRIVER, DRIVER+, TAWARA_RTM, EDEN, PHAROS, RESCUER and TARGET (TIEMS RTD 2019).

TIEMS international certification - TQC

TIEMS believes that Education, Training and International Certification in Emergency Management and Disaster Response is the key to improved resilience worldwide and TIEMS has therefore launched its own RTD project developing a comprehensive international education, training and certification program under the motto, Preparedness Saves Lives!

What is TQC?

TIEMS international certification project has been called Certification of Qualifications in International Emergency and Disaster Management (QIEDM), or just TQC. The long-term goal is to become an internationally certification body officially accredited by a recognised accreditation body. The short- and medium-term goal is to set up the certification procedure, to implement the supporting certification platform, to get experience and to be recognised worldwide (TIEMS Education, 2019).

Benefits of international certification

You may be asking yourself what the benefits of being internationally certified are. One reason is that by being internationally certified, you show that you are knowledgeable in the four core components of emergency management: preparedness, response, recovery and mitigation. TQC aims to be internationally recognised, for that it may be necessary to complement TQC with a national certification recognised by the specific country in which the applicant is operating. Another reason is to be professionally recognised by other professional emergency managers. By being internationally certified, you are more marketable in looking for another position, whether it is for a promotion or another position outside of the law enforcement profession. Many positions for managers in emergency

management are seeking a certification as a prerequisite to employment.

With that in mind, TIEMS wish to fill the gap of an Internationally Recognised Certification Body, awarding an assessment-based certification based on the evaluation of Compliance Assessment Results and Test Examination Results, provided by two distinct Sections of TIEMS.

TQC Certification is reserved for individuals who have demonstrated their knowledge and experience in the risk management / emergency management / disaster response as certified by the TIEMS Certification Body based first on the results evaluation of TQC Compliance, and after on the results evaluation of TQC examination, with reference to International Standards and Best Practices. Prerequisite to apply for TQC Certification is to satisfy the Minimum CV Requirements.

TQC certification is a voluntary process by which individuals are evaluated against predetermined standards for knowledge, skills, or competencies, as well as test exam results. Participants who demonstrate they meet the certification requirements by successfully completing the assessment process are granted a time-limited credential. To retain the credential, participants must maintain continued competence and periodically re-evaluated. The importance of International Certification is recognised worldwide, as mentioned in the Report of World Bank Civil Protection (World Bank Desk Report, 2018)

Why another certification scheme?

Although there are several higher qualifications and certification schemes in Emergency Management, they mainly focus on specific countries' requirements rather than an international focus. Looking throughout different certification schemes worldwide, we have found none which goes through an official internationally recognised accreditation for certification. They simply "go through a generic and general endorsement from parts of the international community". TIEMS long term plan is to go throughout an official accreditation path for TQC Certification.

TQC certification concept

It is represented by the following picture and at this time is well supported by a documented functional requirements specification for all four sections (see Figure 5).

TQC certification platform implementation

The supporting certification platform is going to be implemented for the beta testing activities as reported below (see Figure 6).

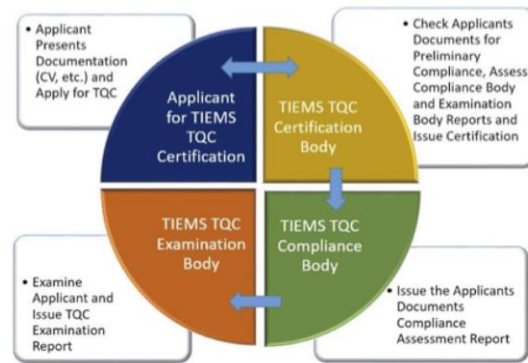


Figure 5: TIEMS TQC Certification Concept (TIEMS Education 2019).

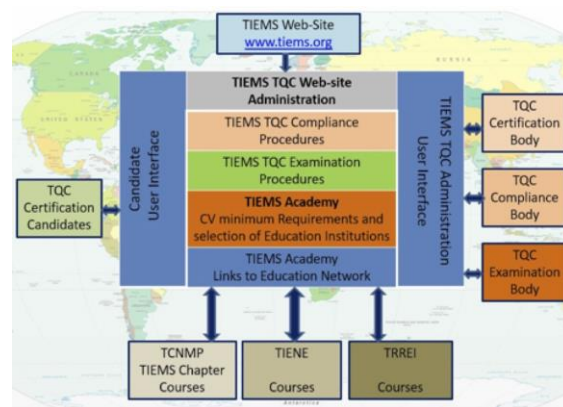


Figure 6: TQC Certification Platform (TIEMS Education 2019).

Conclusion

TIEMS has through above described projects established itself as a valuable partner in EU RTD projects, contributing to improved resilience worldwide. The variety of projects also shows that emergency management is valuable methodology in different fields, above described for public safety communication, protection of cultural heritage towards climate change, building an expert HUB for wildfires in Europe, addressing epidemics and pandemics issues, and developing an international certification of qualifications in emergency and disaster management.

TIEMS International Group of Experts (TIGE) is also a unique international, multicultural and multi-disciplinary group of experts to be used as an international expert reference group in emergency and disaster management.

TIEMS continues to be a partner in EU RTD projects, and TIEMS is at the moment invited to be a partner in four proposals addressing different EU Calls for proposals in the security field.

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