THE INTERNATIONAL EMERGENCY MANAGEMENT SOCIETY

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Picture of some Heros from the Thailand Cave Rescue Drama

In this issue

The International Emergency Management Society

TIEMS continues its international development, and is spreading out its activity more and more worldwide, with members and chapters. New members and chapters add valuable expertise and cultural diversity to the TIEMS international network, which comprises of users, planners, researchers, industry, managers, response personnel, practitioners, social scientists, and other interested parties within emergency management and disaster response. This network constitutes a large international multidisciplinary group of experts, with different educational backgrounds and various experiences. Read more about this network and its activities in this newsletter.

Joseph Pollack
TIEMS Newsletter Editor

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MESSAGE FROM TIEMS PRESIDENT

Honour a Hero

I like to start my editorial with honouring a real hero, Saman Gunan, a former Thai Navy SEAL, who lost his life when participating in the rescue operation at the Tham Luang Cave in Thailand, rescuing 12 boys of a football team and their trainer who was trapped in a flooded cave. May he Rest in Peace with a Glory over his Grave.

This rescue operation itself is a remarkable effort of professionals and volunteers working together in what seemed as an impossible mission. I watched and listened to the news every day, together with millions of people around the world, and was very happy and applauded when all boys were safe out of the cave.

As an international emergency management specialist, I like to compliment all that participated, professionals as well as volunteers, who made the rescue of the boys successful, and the operation can serve as a good example for others in the emergency management community. They dealt with an impossible mission, had to handle pressure from more than 1000 journalists from all over the world asking for news constantly and looking for a story, and parents in grief that also needed comfort, and much more.

They all are outstanding individuals with skills, dedication and passion for their mission, which turned out as a successful emergency event everybody in the international emergency management community can learn from.

TIEMS 25th Anniversary and 2018 Annual Conference

It all started in 1993, in a hotel room in Washington DC, where a group of international emergency management specialists gather with the mission of forming TIEMS. The brief history is as follows:

1993

TIEMS was established in Washington DC, USA, as The International Emergency Management and Engineering Society (TIEMES) and registered in Dallas, Texas, USA, as a non-profit organisation. Among the group of founders were Jim Sullivan, USA (First President), K. Harald Drager, Norway (First Vice President), Suleyman Tufecki, USA (First Treasurer), Jean Luc Wybo (Board Member), France and Ross Newkirk (Board Member), Canada.

1996

The Society was re-organized and changed its name to The International Emergency Management Society (TIEMS) and its registration was moved to Florida, USA

2003

The Society's registration was moved to Zürich, Switzerland in order to be close to other international organisations having operational centres in Switzerland.

2006

TIEMS moved to Belgium, where TIEMS today is registered as an International, Independent and Not for Profit NGO.

More of TIEMS history can be found on TIEMS web-site at:

http://www.tiems.info/index.php/about-us/tiems-history

Oslo 27th July 2018
K. Harald Drager
TIEMS President

The preparation is on full speed for TIEMS 25th Anniversary and 2018 Annual Conference, and below in the newsletter is found the announcement and call for

papers, as well as a presentation of some of the highlights of the conference.

A warm welcome from the President of the Philippines, Rodrigo Duterte is showing how important disaster resilience is for the Philippines, which every year is hit by diasasters, and it is a great honour for TIEMS to be recognized by head of state for the work we do with resilience worldwide.

The conference concept overview is found below.

TIEMS 2018 Annual Conference in Manila Concept Program (Tentative)

Monday 12th November	Tuesday 13th November	Wednesday 14th November	Thursday 15th November	Friday 16th November
Arrival of Delegates Reception and Poster Session and Registration Get Together Networking	Pre- Conference 3rd USTCN Conference on DRR and Climate Change Program	Welcome & Introduction of the Workshops	Welcome & Opening	Plenary Session 2 Keynote Speakers
		Workshop 1 DRR Communication Platform TIEMS Korea Chapter	Plenary Sessions 1 Keynote Speakers	Parallel Technical Sessions
		Coffee Break with visit to Posters & Exhibition (30 min)		
		Workshop 2 Simulation in DRR The Hirain Company	TIEMS Annual General Meeting (1 hour)	Parallel Technical Sessions
		Lunch with visit to Posters & Exhibition (1 hour)		
		Workshop 3 TIEMS TQC Certification TIEMS	Parallel Technical Sessions	Summary & Conclusions
		Coffee Break with visit to Posters & Exhibition (30 min)		Visit to Emergency and Disaster Management Operational Organizations in Manila and Surroundings
		Workshop 4 Industry Presentations Exhibiting Companies	Parallel Technical Sessions	
		Welcome Reception	Gala Dinner	

The confernce takes place at University of Santo Tomas in Manila, 13 – 16 November this year, the oldest university in Asia, more than 400 years old.

The first day is a pre-conference day on the topic; *"The third USTCN Conference on Disaster Risk Reduction and Climate Change"* with excellent speakers addressing this important topic.

The second day we have the workshop day with four workshops addressing and discussing:

1. A Disaster Risk Reduction Communication Platform, lead by TIEMS Korea Chapter.
2. Simulations in Disaster Risk Reduction, by the Hirain Company from Shanghai
3. TIEMS TQC Certification, a worldwide certification initiative by TIEMS for certification of *"Qualifications in International Emergency and Disaster Managment skills"*.
4. Brief presentaions by Exhibiting Industrial companies of their products, systems and solutions.

The conference also has some excellent keynotes, addressing very important issues in international emergency management, for example as shown below, to mention a few:

State of Civil Protection in the world: Typologies, Good practices and Economic Returns

By
Josef Leitmann and Mare Lo of the World Bank.

This will be a presentaion of the results of a worldwide project looking at Civil Protection Agencies worldwide, a project TIEMS particiapte in.

The Philippines' Current Strategies in Earthquake Disaster Risk Reduction

By

Renato U. Solidum, Jr.
Undersecretary for Disaster Risk Reduction and Climate Change

How to Predict the Next Big Earthquake in Manila? Is it possible? The AMaDeUs Approach
By
Dimitar Ouzounov, Garry de la Pomerai and Katsumi Hattori

When knowing that Manila is very earthquake pro, this will be a very hot topic.

But there are many more excellent presentaions that can be found in the announcement and call for papers below.

Looking forward to se many of TIEMS newsletter readers in Manila in November

K. Harald Drager
TIEMS President

EDITOR'S MESSAGE

As the year enters full swing it makes sense to take stock at the half-way point before board meeting season kicks off. It's with much worry and concern that we observe a push towards isolationism in South East Asia, the United States, South America, and Europe. As the Scheshwan governor said in his opening keynote in memory of the Wenchu Earthquake of 2008, it's by working together across social sectors, strata and classes and through international cooperation that we can not only respond but build back better.

We have much to learn from his experience and indeed from eachother's experience. That's why TIEMS is continuing to provide a forum for the exchange of better practices, a neutral space to discuss policy and innovation, and through the TIEMS QIEDM initiative which is getting enough traction for a its forthcoming launch. Do you want to help us build the world's most rewarding and its first international, accredited and recognised crisis management courses for disaster, public and animal health, earthquake and response, CBRNE or policy? Do you want to join our existing members and stakeholders and be amongst the first to graduate? Contact us before the end of the year and we'll make sure you're the first to know!

TIEMS has had a busy summer already with a sizeable delegation having the honour of joining the TIEMS Chinese Chapter (headed by Prof. Guosheng Qu) to participate and sometimes co-host sessions during the 4th international conference on continental earthquakes. Between our SAR & Urban SAR, policy and training, advanced technology, international and humanitarian experts we provided a rescue and response perspective to a best-in-class scientific event. Truly earthquake response fundamentally changed in Asia after 2008, and nothing speaks to the progress made more than the chineese innovations in their built environments, response (re)organisation, financial innovation, and early warning systems – all of which were on display and accessible.

Speaking of scientific and organisational innovation, TIEMS is wrapping up several european projects and kicking off even more of them this year. Contact your local TIEMS expert advisory group member to join us. We've also been supporting the World Bank in its State of Civil Protection Report which is promising to be a seminal update of our understanding of the organsation, investment in and return of today's civil protection system.

If like me you think that's highly interesting, then join us in Manilla for our annual global conference. If you want to know what to expect read on below : we're sharing one of the keynotes about innovative earth observation systems.

So halfway through what can we say? Well, we may be observing disappointing developments such as reduced collaboration between traditional allies and friends, but it's not all doom and gloom! Will south America and West Africa reap the rewards of their increasing collaboration in civil protection and climate change? Will China manage to federate the most diverse group of stakeholders since the Sino-Roman Silk Road in it's Belt and Road Initiative? Will Europe continue to rescue refugees in the mediteranean and support its near eastern members? You can bet your heart that TIEMS will be there supporting all these efforts locally and internationally.

For more information contact me directly and I will gladly orient you based on your needs. Stay up to date with the latest news by reading our newsletter. Read more for special deals and the most exciting upcoming events!

Joseph Pollack
TIEMS Editor

Welcome to

TIEMS 25TH ANNIVERSARY *(1993 – 2018)* CONFERENCE

www.tiems.org

Second Announcement and Call for Papers and Posters

MANILA, PHILIPPINES, November 13 - 16, 2018

At

Pontifical and Royal
UNIVERSITY OF SANTO TOMAS
THE CATHOLIC UNIVERSITY OF THE PHILIPPINES

Sponsors

東方核芯力
DORAPOWER

College of Nursing (1946)

www.ust.edu.ph/nursing

Ver. 27.07.2018

In cooperation with the University of Santo Tomas College of Nursing

Welcome to Manila, Host City of TIEMS 25th Anniversary and 2018 Annual Conference

TIEMS Celebrates its 25th Anniversary in May 2018

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TIEMS 2018 Annual Conference Call for Papers and Posters

In an interconnected and interdependent world, coordination and collaboration between cities, provincial, national, international agencies and non-governmental organizations have become critical to the promotion of disaster management, disaster risk reduction and climate change mitigation. The TIEMS 2018 Annual Conference will explore best practices and emerging technologies, to facilitate the coordination of valuable resources and urban planning strategies to build resilient communities.

The main topic is:

DISASTER RISK REDUCTION AND CLIMATE CHANGE MITIGATION
Plans, Preparation, & Collaborative Strategies.

Presentations from International and Philippines experts will provide valuable insights and the interactive workshops will create an exceptional opportunity to discuss national and international perspectives.

List of Topics (not limited to)

- Disaster Risk Reduction
- Climate change
- Education in crisis and emergency management
- ICT and robotics in crisis and emergency management
- Volunteers in disaster relief and armed conflict zones
- Best practices
- Standards & Certification

Submission Guidelines

All papers must be original and not simultaneously submitted to another conference or journal. The following submissions categories are welcome:

- Full papers
- Posters

Important dates

- Abstract submission deadline: **15th August 2018**
- Notification of acceptance: **1st September 2018**
- Full-text submission: **15th September 2018**
- Final Paper/Poster acceptance: **1st October 2018**

Submission link: *https://easychair.org/cfp/tiemsac2018*

International Program Committee

- Conference Chair - **Kåre Harald DRAGER**, Professor, President of The International Emergency Management Society TIEMS (Norway)
- Co-chair - **Andre SAMBERG**, Professor of Practice, Head of TIEMS Mission to Ukraine (Finland)
- **Guosheng QU**, Professor, Director, Research Center of Digital Disaster Mitigation and Emergency Management (China)
- **Thomas ROBERTSON**, TIEMS Regional Director for North America
- **Jaroslav PEJCOCH**, Chairman of the Board of T-Soft a.s. (Czech Republic)
- **Sandro BOLOGNA**, TIEMS International Program Committee Chair, Past President of the Italian Association of Critical Infrastructure Experts AIIC (Italy)
- **Meen Bahadur Poudyal CHHETRI**, Professor, President of Nepal Center for Disaster Management and Director of the Department of Disaster Management of Dhading District, Under Secretary of the Ministry of Home Affairs, TIEMS Paper Review Committee Chair (Nepal)
- **Jean-Paul MONET**, Lieutenant-colonel, Head of Fire District, Chief of Division of Bouches-du-Rhône Fire Brigade (France)
- **Snježana KNEZIĆ**, Professor, University of Split, Faculty of Civil Engineering, Architecture and Geodesy (Croatia)

- **Young Jai LEE**, Professor, Dongguk University, and Principle Investigator of Global DRR Technology Platform (South Korea)
- **George MARKOWSKY**, Professor, Missouri University of Science and Technology, Chair of TIEMS Academy (USA)
- **Elizabeth D. CORTEZ**, Assistant Professor, University of Santo Tomas Manila (Philippines)
- **Angeli MEDINA**, TIEMS Philippines President (Honorary)

Local Organizing Committee

- **Angeli Medina**, BSN, MPA, RN, CHPCP, CBCP, AMBCI, CEN
- Asst. Prof. **Elizabeth D. Cortez**, MAN, RN, Chair International Relations and Programs UST College of Nursing
  Col. **Judith G. Dolot**, Deputy Director at Bangko Sentral ng Pilipinas
- Dr. **Jaime Almora**, Founder, Almora General Hospital, BOD, PHA
- Ass. Prof. Genecar Pe Benito, MAN, RN, International Relations and Programs, UST College of Nursing
- Ass. Prof. Kathleen Chan, MAN, RN

Publication

TIEMS AC2018 presentations will be published in the TIEMS Open Access Proceedings on the TIEMS website, *www.tiems.org* . Selected papers will be invited for peer-review publishing in an international journal.

Preliminary Conference Program Concept

TIEMS 2018 Annual Conference in Manila Concept Program (Tentative)

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Venue

The conference venue is The UST College of Nursing: *www.ust.edu.ph/nursing*.

Contact

Submissions and conference questions should be e-mailed: to *angelism60@gmail.com*.

Exhibition

The international emergency management industries are welcome to exhibit their products, systems and solutions for improved resilience, and arrange local workshops for demonstrations.

TIEMS 2018 Annual Conference Registration and Payment

Conference registration fees (in USD)

Registration Type	Before August 15th, 2018 Early Bird	August 15 - November 12, 2018	On registration
TIEMS Member	250	275	300
Non TIEMS Member	300	325	350
Government/Military/NGO	100	125	150
Philippine Local Residents	80	90	100
Active Students	50	60	70
Exhibition Space (6 $m^{2)1}$	650	700	750

1. Exhibition Space Registration includes one full personnel registration
2. Registration fee includes one year TIEMS membership fee
3. No refund of registration fee after October 1st 2018
4. Registration fee includes access to the full conference program, lunch and coffee every day, social events, gala dinner, conference paper program and conference proceedings on an USB

There will be arranged a TIEMS 25th Anniversary Gala Dinner on Thursday 15th November 2018, and more details of this event will be given shortly. TIEMS accepts payment with PayPal, Credit Cards (Visa, Master Card and American Express) and Bank Transfer to TIEMS Account.

Please, use the following link for registration and payment:

http://www.tiems.info/index.php/events-reg-pay/tiems-2017-annual-conference

Remember Early Bird Registration before August 15th, 2018

WELCOME MESSAGE FROM THE PRESIDENT OF THE PHILIPPINES

MALACAÑAN PALACE
MANILA

MESSAGE

My warmest greetings to **The International Emergency Management Society** as it holds its **25th Annual Conference on Disaster Risk Reduction and Climate Change Mitigation**.

In recent years, our nation has witnessed and experienced some of the worst calamities recorded in history, testing our people's unity in times of tragedy and proving our ability to smile in the face of adversity.

With a wide scope of professionals and industry leaders in attendance, this gathering is a vital opportunity to learn about the latest technical and operational methodologies in global emergency and disaster management. May today's activities further accelerate the progress of your sector and improve society's competence to respond to and recover from natural and man-made disasters.

I look forward to the solutions and innovations this conference will bring as we collectively address climate change and engender a culture of safety, preparedness and resilience in our communities.

I wish you all a successful and productive event.

RODRIGO ROA DUTERTE

MANILA
14 November 2018

THE PRESIDENT OF THE PHILIPPINES

WELCOME MESSAGE FROM THE HOST OF THE CONFERENCE

Dear TIEMS Colleagues,

On behalf of the University of Santo Tomas College of Nursing (USTCN), it gives us the greatest honor and pleasure to invite you to attend the 2018 The International Emergency Management Society (TIEMS) Annual Conference to be held in Manila, Philippines at the University of Santo Tomas (UST), Thomasian Alumni Center, Buenaventura Garcia Paredes, O.P. Building from November 14-16, 2018. A pre-conference on Disaster Risk Reduction and Climate Change Mitigation, sponsored by USTCN will be held at the UST College of Medicine Auditorium on November 13, 2018. We are very excited to be hosting this great conference on "Disaster Risk Reduction and Climate Change Mitigation: Plans, Preparation & Collaborative Strategies." We hope to follow the successful footsteps of the TIEMS conferences in San Diego, California in 2016 and Kiev, Ukraine in 2017.

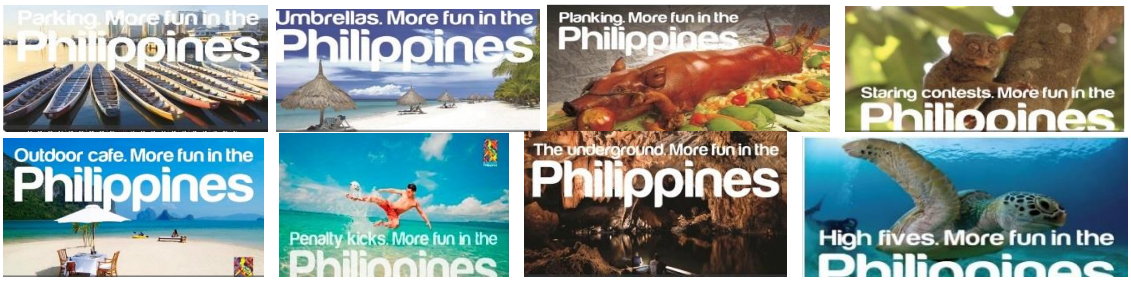
K. Harald Drager, TIEMS President has developed a vigorous TIEMS Local and International Organizing Committees consisting of outstanding USTCN International Relations Team and TIEMS Board members from Norway, China, USA, Croatia, Czech Republic, South Korea, Nepal, Italy, Iraq, France, Australia, Canada, Japan, Russia, Philippines, UK, Argentina and Nepal. The TIEMS program committee is planning an excellent spectrum of topics ranging from disaster risk reduction platform, climate change, earthquake, TQC certification, technical sessions, to World Bank global study on civil protection.

The members of the TIEMS organizing committee in Manila are very proud and privileged to be hosting the 2018 TIEMS Annual Conference and look forward to welcoming you to our city and country. The Philippines is the third largest English speaking country in the world. It has a rich history combining Asian, European, and American influences. The Philippines is a vibrant place with hospitable people throughout 7,500 to 7641 islands depending on it's high or low tides.

Please save the date for the 2018 TIEMS Conference on November 13-16, 2018, so you may network with your colleagues in what we hope to be a fabulous conference.
Sincerely,

Angeli Medina, MPA, RN, CHPCP, CBCP, CEN
Co-Host, TIEMS Annual Conference, Manila, Philippines

(Images from Philippines Department of Tourism)



Preliminary Detailed Program

13th November Pre Conference Program

The third USTCN Conference on Disaster Risk Reduction and Climate Change

Objectives:

1. Increase awareness on the issues of disaster risk reduction and climate change mitigation
2. Develop initiatives and collaboration among different sectors in the society
3. Promote awareness of the development of disaster resilience programs and climate actions in varied sectors
4. Promote awareness of the rebuilding efforts in Marawi City

Main Topic:

Disaster Risk Reduction and Climate Change Mitigation: Plans, Preparation, & Collaborative Strategies

Date: November 13, 2018

Venue: UST College of Medicine Auditorium

Morning Session:

08:00 – 08:30 am: ***"Opening Prayer, National Anthem & Welcome and opening Remark"***
Very Reverend Fr. Herminio Dagohoy, O.P., Ph.D
Rector University of Santo Tomas

08:30 – 09:00 am: ***"New Disaster Management Paradigm"***
Dr. Francisco A. Magno Magno
De La Salle University
Director Jesse M. Robredo
Institute of Local Governance

09:00 – 09:30 am: ***"Disaster Risk Reduction"***
Speaker to *be Announced*

09:30 – 10:00 am: ***"Climate Change Commission Initiatives"***
Speaker to *be Announced*

10:30 – 10:30 am: ***"The Philippines' Current Strategies in Disaster Risk Reduction & Climate Change"***
Honorable Undersecretary/ Dr. Renato Solidum Jr.
Undersecretary, Disaster Risk Reduction and Climate Change Adaptation - DOST

10:30 - 11:00 am: ***"Civil Protection During Disasters"***
Director Susana Juangco, MPH, RN
Capacity Building and Training Service, Office of Civil Defense-NDRRMC

11:00- 11:30 am: ***"US DRR Efforts in the Philippines"***
Speaker to be Announced

11:30 – 12:15 am: ***"Mutual Assistance Agreement"***
Dr. Jaime Almora,
Founder of Almora General Hospital, BOD, PHA
"HCRC/Volunteerism & Academic Society"
Co-presenter Angeli Medina BSN, MPA, CHPCP, CBCP, AMBCI, CEN
Patient Services Nurse Educator

11:45 – 12:15 pm: ***"Status of SMD Hospital & Rebuilding Efforts in Malawi City".***
Dr. Saffrullah M. Dipatuan
Medical Director, SMD General Hospital, Marawi City

12:15 – 1:00 pm: ***LUNCH BREAK***

Afternoon Session:

01:00 – 01:45 pm: ***"Leadership in Disaster Management"***
Dr. Ralph Brower
Associate Professor, Director, Center for Civic & Nonprofit Leadership
Florida State University

01:45 – 02:30 pm: ***"Status of SMD Hospital & Rebuilding Efforts in Malawi City"***
Dr. Saffrullah M. Dipatuan
Medical Director, SMD General Hospital, Marawi City
"Rebuilding Efforts in Marawi City"
Co-Presenter to be Announced

02:30 - 02:45 pm: ***USTCN Choir***

02:45 - 03:15 pm: ***"Volunteer Prep for the Big One"***
Mayfourth Luneta
Deputy Director, Center for Disaster Preparedness

03:15 - 03:45 pm: **"*Welcome Remarks for TIEMS Conference Attendees"***
K. Harald Drager,
TIEMS President

03:45 – 04:15 pm: ***"Emergency Preparedness & Response for Catastrophe"***
Dr. Gousheng Qu
TIEMS Vice President

04:15 – 04:45 pm: ***"Preserving Cultural Heritage as Climate Changes"***
Dr. Thomas V. Robertson
TIEMS Regional Director for North America

4:30 pm: ***Closing Remarks***
Dean Susan N. Maravilla, DNM, RN,
Dean College, USTCN

UST Hymn

14th November Conference Program

Welcome & Introduction of the Workshops TIEMS President K. Harald Drager
Workshop 1 Disaster Risk Reduction Communication Platform TIEMS Korea Chapter
Coffee Break with visit to Posters & Exhibition (30 min)
Workshop 2 Simulations in Disaster Risk Reduction The Hirain Company
Lunch with visit to Posters & Exhibition (1 hour)
Workshop 3 TIEMS TQC Certification TIEMS
Coffee Break with visit to Posters & Exhibition (30 min)
Workshop 4 Industry Presentations Exhibiting Companies
Welcome Reception

Workshop 1
Disaster Risk Reduction (DRR) Communication Platform
TIEMS Korea Chapter

Workshop Chair: Yejin Kim

Topic

Local community resilience, public private partnership

Objectives

To introduce how local government stakeholders, especially disaster management divisions/teams work to strengthen local community resilience (4-5 case studies tentatively).

Speakers

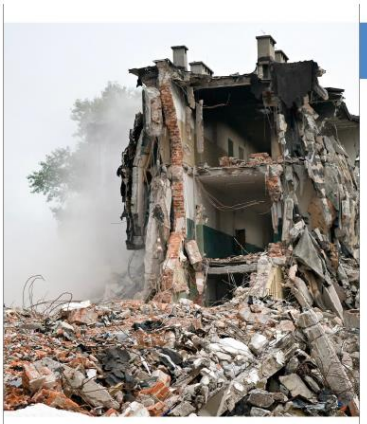
Local governments (Songa District/Korea, Makati/Philippines, Representative from China, Representative from Japan, and Representative from Thailand.

Global DRR Technology

Background

The Government of Korea declared the Incheon Regional Roadmap (REMAP) to mainstream disaster risk reduction (DRR) and climate change adaptation(CCA) at the 4th Asian Ministerial Conferences on Disaster Risk Reduction (AMCDRR) in 2010. The REMAP seeks to foster DRR capacity building and promote sharing of information, technology, sound practices, which can result in development of climate and disaster resilient policies and community planning. To meet such needs, a DRR Technology Platform has been developed after rounds of consultations and financial support from by the Ministry of Interior and Safety (MOIS), Korea.

Aligned with the Sendai Framework for Disaster Risk Reduction 2015-2030 and the Sustainable Development Goals (SDGs), the DRR Technology Platform aims to achieve inclusive and participatory information sharing and networking among all cross sectoral stakeholders (national & local governments, regional & international organizations, academia, NGOs and private sector) to build community resilience by leveraging Information and Communications Technology(ICT).



Supported by

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TIEMS

Korean Society of Disaster & Security

For further information, please visit our website at
www.pr4gdm.org

or contact us:
Email : **koreaocm@gmail.com**
Telephone : **+82-10-2555-3444**

www.pr4gdm.org ▸ Global DRR Technology

Introduction

Global DRR Technology is an online Community of Practice on disaster and climate resilience. It is open to all users where each one can freely upload and download relevant information.

The site provides practical a information including :

- DRR Case Studies
- DRR Technology Products
- DRR Technology Provider
- DRR Community
- DRR Policy and Photo etc.

DDR PLATFORM

The platform contains various case studies illustrating problem-solving, project development and technology products in use with multi-media images and equipment specifications that demonstrate effective implementation.

Case Study Songpa-gu (district) Office, Seoul Metropolitan Government, Korea Solar Energy Sharing project

Integrated wind-solar power generation system installation site

Songpa Solar Energy Plant sign board

Objective Establish a low-carbon green community by operating energy independent villages

- **Target : min 1kW – 300 households, 3kW – more than 30 households (2018)**

Saving	Efficiency	Production
"Saving activity"	"Efficient use of energy" by minimizing leaking heat and energy	"Solar installation" for renewable energy production
• Resident education • Energy saving • Recycling	• House insulation • Window improvement • LED replacement • Energy diagnosis	• Solar photovoltaic installation • Mini photovoltaic installation

Maintain Self-sufficient energy infrastructure

DDR PRODUCT

It is also a space for stakeholders to showcase their projects or promote commercial products especially from the private sector. Then users can easily create an online discussion board to facilitate interactive dialogues.

In addition to serving as a data repository, the platform strives to enhance public private partnership especially between local governments and private sector. Each entity can find potential project partner by exploring case studies, projects and registered companies.

The platform also features over 100 products for DRR applications. From state-of-the-art flood sensors to ISO certified warning system equipment, from system management software to meteorological observation devices, the products span a wide range of emergency management needs.

DRR COMMUNITY

Committed to networking and research, the platform provides a space for users to discuss on progress, challenges and recommendations to create safe and resilient environment. The "Community" feature allows users to post information, comments, and questions about DRR technology and relevant issues.

In addition, there is a vast repository of DRR research resources ranging from individual national policies to international frameworks.

Workshop 2

Simulations in Disaster Risk Reduction
The Hirain Company

Workshop Chair: Gianming Shu

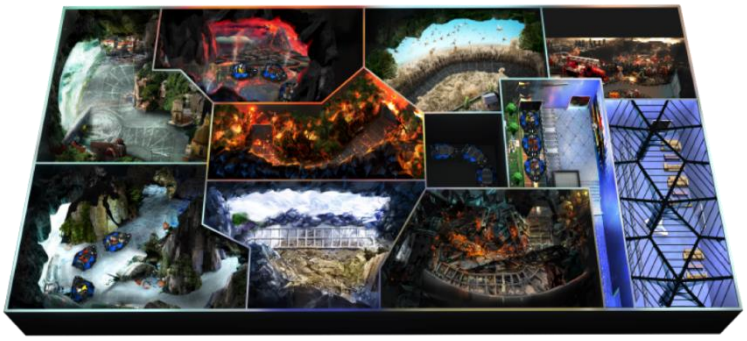
Hirain-Boya has established a strategic cooperative relationship with the International Emergency Management Society(TIEMS) , Digital Disaster Reduction and Emergency Management Research Center, IDC, PKU and International Emergency Industrial Technology Innovation Strategic Alliance(IEITISA). Under the guidance of experts both at home and abroad, Hirain-Boya is committed to enhance the safety awareness and the ability to prevent and cope with emergencies among the public, and actively promote the rapid development of the emergency industry and disaster reduction cultural undertakings, which provides knowledge reserves, material security, technical support and professional services for the safety and stability of the community.

The core business of the company involves culture transmission of disaster prevention and mitigation, emergency safety experience, disaster coping education and training, which includes hosting international emergency exhibition and symposium, creating emergency products and technology trading platforms, developing emergency VR & amp; AR education products, implementing emergency safety experience projects and carrying out disaster coping education and training.

Hirain-Boya focuses on cultural tourism scenic spots, amusement theme parks, creative consulting of theme parks, management planning and project operation services. The company brings together the talents of emergency, disaster prevention, security, education, entertainment, art, exhibition and tourism, relying on the core concepts of disaster prevention, disaster reduction and emergency safety, and using new technologies such as 3D, 4D, VR, AR and NFC and entertainment means, which has successfully completed a number of emergency projects both at home and abroad and is the leading and only "one-stop" service enterprise with the combination of consulting planning, creative design, construction projects, scenarios, landscaping sculpture, art production, multimedia technology integration, IP video customization and operation management, etc.

Application of patent products

1、7-min-ride into disaster



This international first-class project was originated by Hirain Group. Combining major disasters with the dark-ride technology, we allow the visitors experience the devastating force of those disasters. The visitor will go through seven disaster scenes include earthquake, floods, tsunami, plague of insects, etc. With so many kinds of disasters happened one after another in the same place, this is a breakthrough that never seen before. After a 7 minutes ride through disasters, the visitor will have a profound and intuitive understanding towards disaster.

2、The 360 panoramic shuttles of the volcano

Combined with the volcanic disaster and the 360° panoramic shuttle, this is an advanced project with experience. At the beginning, the visitors will enter the experience area and sitting at the seats that linked to each other and formed a loop of 360°. Then, the seats will be lifted up to the screen area, which is circular-screen of 360°. Follow the plot of the film, the seats will make the motions like clockwise and counterclockwise rotating, bouncing up and down; each seat will have effects like vibration, air blast, water. With the content of the film, all the effects will cause some visual illusion to the tourists; make them having the feelings of falling into the abyss or pumping into the sky. The ups and downs of the somatic effect combined with the film will give visitors an unparalleled experience of stimulation.

3、Disaster Leap Cinema

This is a kind of experience equipment that combines the huge dome screen and the seats of motion to enjoy the extreme flight experience. When the visitors take their seats, the seat baffles will put down, and the seats will be launched, and suspended in front of the screen, and the visitors' feet will leave the ground like a flying bird.With the customized movie of disaster theme, the seats will moves from the left to the right and from the front to the back, so that the visitors have the feeling of an eagle flying in the clouds, and sometimes dives to the fire or fly over to the top of the mountain. It is an unprecedented way to experience disaster.

4、360 degree immersive ball screen Theater

The 360 degree immersion ball theater is a 14 meter ball with 12 meters in diameter and an impressive 360 degree ball projection. The middle of the ball is a tempered glass corridor with a width of 2 meters wide and 12 meters long. It can hold 50 visitors at one time. Visitors can enter the ball screen from one side of the staircase, and the screen is filled with 18 high-definition laser projections. The movie lasts about 6 minutes, which enables tourists to tourists truly experience the disaster scene, in order to deepen their understanding and experience of disaster scenes, and enhance their awareness of disaster prevention and reductions.

5、VR Earthquake House

We apply the virtual reality technology to the earthquake experience house to create the first VR earthquake experience house in China. The VR earthquake house realistically reproduces the "terrible scenes" of a real earthquake through VR technology, which is supplemented by earthquake simulation platform movements and simulates all kinds and all levels of earthquakes, allowing the people to experience the thrilling earthquake in the VR-created virtual space.

6、5D Multidimensional Time-travel

Dynamic 5D Ride break through the mode of traditional cinemas. It takes the car with visitors as a carrier; send them into two arc giant screens to encircling the vision of the car. With 3D movies of disaster theme and shaking platforms, the visitors will have an extremely shocking experience.

7、VR Virtual Driving

The "VR Virtual Driving" project consists of a complete experience system, including VR glasses, steering wheel, shift lever and seats. The entire system can not only simulate extreme weather conditions such as rain and snow, but also simulate a variety of man-made traffic accidents. For example, in the simulation of the drunken driving accidents, there is a hydraulic rod behind the seat to simulate the shaking effect while drunk driving. Besides, there is an indicator in front of the seat, which can fully display the effects of people who

experience in the VR video. VR, through real simulation, makes people personally on the scene, so as to more deeply understand the danger of traffic accidents.

8、VR Virtual Display Electronic Mall

The arrival of VR and AR must be a great revolution for e-commerce and offline shopping. The same is true for emergency equipment selection and purchase. For example, to purchase a fire extinguisher or first aid kit, you do not need to extinguish the fire or rescue on site. Just wear our VR / AR equipment we developed, then you can experience and understand the use of the product in real time. From the pre-purchase category selection, to the purchase of the trial experience, and finally to the purchase of "recommended similar products ", VR / AR technology have used throughout all aspects of the shopping scene.

Workshop 3

TIEMS TQC International Certification: Operations and Good Practice TIEMS

TQC = TIEMS Qualification in International Emergency Management Certification

Workshop Chair: Sandro Bologna

TIEMS TQC Certification

With an increasing number of disasters worldwide, resulting in more international collaboration and support to disaster stricken areas, the need for more education and training in emergency and disaster management seems evident. TIEMS believes that it is important to raise the awareness of the competencies needed in emergency and disaster management, and to support those participating in these activities and operations in acquiring those competencies in an international setting

An international certification has been launched by TIEMS, called Certification of Qualifications in International Emergency and Disaster Management (QIEDM), or TIEMS QIEDM Certification or just TQC

The full name of the TQC certification is:

TIEMS TQC International Certification - Operations and Good Practise

3

The Workshop will answer to some of the basic questions, as follow:

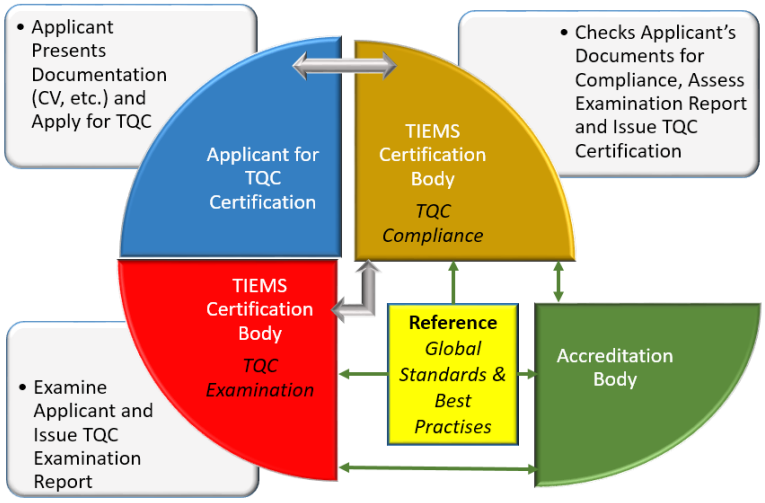
1. ***Why become an International Certified Emergency Manager?***
   It is a requirement from many countries, as reported in a survey from TIEMS and in a Report from World Bank

2. ***What are the steps of getting certified?***
   Up today there is no general accepted Certification Scheme. In some countries, you need to pass a certification exam before you can be considered for an EM position. In others it's sufficient to have an appropriate CV. Countries have different EM requirements.

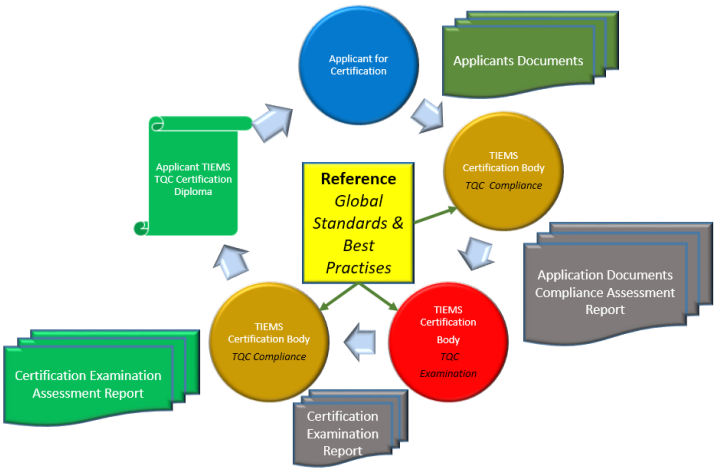
3. ***What it means appropriate CV?***
   To have an appropriate work history, experience, education training, references. It is different from different certification schemes and from country to country.

4. ***How TIEMS TQC will work?***
   It is intended to set up a Accredited Certification Body in charge both for the preliminary CV verification and the certification exam. The big news is in the undertaking of the Accreditation process, against specific standards and released by an authorized Accreditation Body.

TIEMS TQC Certification Concept



TIEMS TQC Certification Document Flow



TIEMS TQC Certification Reference Standard & Best Practices

Any international recognized standard and best practice within Emergency and Risk Management, related to all phases of the Emergency Management and Risk Management Cycles, against which the TIEMS Certification Body do their Evaluation of the Applicant

TIEMS has started a Survey of the existing National and International Standards, Best Practices, Guidelines, etc. about Emergency and Risk Management in the different Countries, where they exist

Workshop 4
Industry Presentations

Exhibiting Companies

Workshop Chair: Thomas Robertson

Exhibiting Companies are presenting their companies and systems and solutions.

15th November Conference Program

Welcome & Opening
Plenary Sessions 1
Coffee Break with visit to Posters & Exhibition (30 min)
TIEMS Annual General Meeting (1 hour)
Lunch with visit to Posters & Exhibition (1 hour)
Parallel Technical Sessions
Coffee Break with visit to Posters & Exhibition (30 min)
Parallel Technical Sessions
TIEMS Gala Dinner

Welcome to University of Santo Tomas

UST Rector Herminio Dagohoy, O.P., Ph.D.

TIEMS International Activities to improve Global Resilience

Kåre Harald Drager
TIEMS President

An update of TIEMS development and activities worldwide.

Keynote Speakers

State of Civil Protection in the world: Typologies, Good practices and Economic Returns

Josef Leitmann and Mare LO

Abstract

In the framework of TIEMS 25th Anniversary and 2018 Annual Conference, the Global Facility for Disaster Recovery and Resilience and its partners to the global study on the state of civil protection are pleased to share the initial findings emerging from the Literature review and select country case studies.

Launched in late 2017, the study is a World Bank initiative whose objective is to build a common knowledge base of the different civil protection systems and practices around the world. The analysis is illustrated by in-depth review of best practices, challenges and lessons-learnt that could help to build consensus on the role of civil protection and its potential benefits in the overall framework of disaster risk management and resilience. This initiative fills a gap. It provides a robust comparative basis for lessons learned.

A civil protection system in a country is the coordinated framework of laws, plans, organizations, people and resources working together to protect civilians, assets and economic activities against the negative impact of natural or man-made disasters and accidents.

A civil protection organization is any state, volunteer or non-governmental entity assuming one or many responsibilities in the functions of a civil protection system at national, regional, local or international level. The main identified functions are typically Disaster Management and Resilience, Law enforcement, Emergency Response Services, Emergency Medical Services, Community Support Services, Cooperation and International Emergency Response Assistance.

As shown in many studies and reports, the concept of civil protection is diversely understood and implemented across countries, cultures and state of development. While it primarily embodies the responsibility and the ability of the modern state to protect its citizen, their activities and assets against adverse natural or man-made events, the reality of civil protection is quite complex. There is a broad range of cultural and economic enablers, and challenges. Geography and historical trends are key determinants of the state of the civil protection in a country.

A comprehensive literature review on civil protection has been completed. It summarizes the existing knowledge and highlights salient issues and opportunities, while providing indications for further research through country specific case studies. Case studies in United Kingdom, United States, France, Mexico, and Chile are available. Tanzania, Turkey, Japan, Bangladesh, Senegal, Austria, Cambodia, and Australia are in process.

The typology of civil protection in the world presented by the desk-review report is non-exhaustive and based on an integrated approach to risk and resilience. The typology uses only a few qualitative drivers and indicators that are comparable and scalable, thus setting a framework for further data collection and analysis.

The typology is an attempt to arrange civil protection systems in the world into a few categories, using a qualitative approach that is not an opinion on performance. The categories were established using a set of criteria that are comparable and scalable across different geographical regions and cultural contexts. A matrix of the basic civil protection roles and functions is used to capture the reported or discussed capacity of the civil protection system in each country, in terms of the presence, and coverage of emergency management services at national, regional and local level. Existing international classifications of technical capacity were also used in the capacity mapping process, such as the IEC of INSARAG, complemented with data on disasters from the EMDAT global database. All countries in the world were reviewed and grouped into five categories reflecting the state of their civil protection system.

The report is structured around four key chapters, presenting the questions, the approach, the challenges and how they are addressed. It also provides a short historical background of civil protection in the world followed by a discussion on the definitions, and a presentation of the key roles and functions which can be assessed in any country, using a simple checklist. For this, a matrix of the core roles and functions of civil protection was established. This allows for a comparative analysis of countries using a common set of variables and indicators. In country cases, a rapid survey of stakeholders can support a reliable set of qualitative indicators of the state of the civil protection institutionally and technically, at national, regional and local level. A global typology of civil protection is thus presented and countries are mapped into five groups. The desk study also provides a description of the key characteristics of each group as well as its strengths, weakness, opportunities and threats (SWOT). The report then offers a brief presentation and mapping of the civil protection system in sixteen countries including their legislative and legal frameworks, coordination and operational arrangements for emergency preparedness, response, recovery, mitigation and resilience, and their ability to contribute to international emergency relief or to interface with foreign disaster assistance teams. Finally, the literature review offers a set of strategic recommendations for further studies and possible short-term interventions to support the development of civil protection systems globally.

Findings I: Global Typology of Civil Protection Systems

Through the review of reports and studies, civil protection systems in the world can be broadly mapped into three categories: ***Structured, Semi-Structured and Unstructured***. Furthermore, a manageable typology of civil protection can be articulated on mapping ***Formal and Informal Civil Protection Systems***. Formal civil security systems are structured or semi-structured. Informal civil security systems are unstructured. The study established a global typology of Civil Protection Systems using five qualitative groups: ***Mature, Developed, Developing, Semi-Structured and Unstructured***. The descriptors are based on institutional

settings, coordination, arrangement, technical capacity, the spatial coverage of emergency services and the ability to respond and recover from natural or man-made disasters at all levels. The formal or informal status of a civil protection system is not a statement of effectiveness. In some situations, a formal system could prove dysfunctional or unable to cope, while an informal system may react well and recover faster under similar stress.

	Development Stage	Capacity-Coverage	Coordination	Recovery
CAT1	MATURE	VERY STRONG	STRUCTURED	RESILIENT
CAT2	DEVELOPED	STRONG		
CAT3	DEVELOPING	MEDIUM	SEMI-STRUCTURED	VULNERABLE
CAT5	SEMI-STRUCTURED	LOW		
CAT6	UNSTRUCTURED	VERY LOW	UNSTRUCTURED	FRAGILE

Table 1: The Global Categories of Civil Protection Systems

CATEGORY 1. Mature civil protection systems (coverage above 70%)

A strong or Mature civil protection system is ancient and tested (high score in over 70% of all components of the civil protection matrix). It is well established institutionally and highly regulated, guided with a developed set of legislations, laws, measures, norms and agreements, with a high capacity to enforce it. This type of system is not reactive, but anticipative, it adapts to threats and has established resilience as a driving goal. Generally, countries in this typology are able to cope with all types of emergencies, small or large-scale.

CATEGORY 2. Developed civil protection system (40-70%)

A Developed civil protection system presents the institutional and technical characteristics of a mature system, however with limited capacity and geographical coverage (Medium to high score in 40-70% of all components of the civil protection system). Such systems are found in countries culturally oriented towards an elaborated protection of their citizens against disasters. Nevertheless, the expansion of the civil protection system is hampered by challenges experienced in their history and economic constraints. They are generally able to cope with most types of small emergencies. However, when facing large-scale events, they may require foreign technical and financial assistance.

CATEGORY 3. Developing civil protection system (20-40%)

A Developing civil protection system is established on a regulated framework, but it lacks the capacity to enforce it. Such systems present chronic gaps in terms of technical capacity and coverage (Medium to high score below 40% of all components of the civil protection system). In such systems, the coverage for small incidents is low and relies on social safety nets, particularly in rural areas. It is also the largest group.

CATEGORY 4. Semi-structured civil protection system (10-20% coverage)

A Semi-structured civil protection system has some institutional and technical components in place. However, the ability of actors to work together is low; the already low capacity is

impeded by ad-hoc and overlapping interventions. The roles and responsibilities are not clearly delineated. The limited transparency and collaboration, results in duplication of efforts or ineffective prioritization. In such systems, the capacity gaps are higher than observed in underdeveloped systems. Large geographical areas are far away from professional emergency services. Also, in such systems, humanitarian situations can develop, justifying the deployment of humanitarian actors who are gradually involved in responding to small incidents with resources initially allocated to large-scale slow-unset emergencies. Although government funding can be made available in case of major disasters, such system overly relies on international aid for most components.

CATEGORY 5. Unstructured civil protection system (coverage below 10%)

An Unstructured civil protection system is dominated by independent actors, with limited coordination. It is reactive and ad-hoc based. It evolves out of necessity and good faith, usually on humanitarian basis. It is mostly found in fragile States.

Findings II: Review of Selected Countries

The review presents the civil protection system of sixteen countries selected by the World Bank GFDRR. The report attempts to summarize their status, while examining key strengths and potential gaps, against the challenges of natural or man-made disasters. Although they play a major role during emergencies, the law enforcement roles were not examined, as the report focuses on preparedness, response, recovery, mitigation and resilience.

The review reveals that each country's situation is defined by its geography and history, the demographic pressure, the governance model and the economy. It shows that there is no perfect model of civil security. However, the high level of organization and technical expertise in the key roles and functions of the civil protection are key in defining a strong system. Such system is also one which ensures an extensive coverage of communities with emergency management services. A huge level of readiness is found at national, regional and local levels. However, they are not perfect. Their main weaknesses are a low tolerance to risk, the complexity of procedural requirements, the complexity of accessing funding at local level, the inequalities among communities and the lack of operational flexibility, due to the burden of procedures. They are also challenged by the rising of new threats, such as terrorism. This is the case of the United States, France, Ukraine, Australia, New Zealand, Japan, United Kingdom, Chile, Turkey, China and India.

New Zealand, Japan and Chile present the best practices in emergency preparedness in the context of a high exposure to natural hazards such as earthquakes, volcanoes, tsunamis and extreme weather. To note, is the rigor and inclusiveness of planning in all phases of the emergency management cycle. Also, these countries adjust their regulations following the close scientific monitoring and assessment of hazards and risks. Their national culture of leaving with risks is a model. New Zealand, Japan and Chile have developed innovative approaches to risk education adapted to the permanence of serious threats in their communities.

Morocco and Mexico are example of countries where the combination of State and community engagement is a strong foundation for further development; especially, their municipal capacity. Senegal offers an example of a developing civil protection system, with a solid institutional and cultural basis but with technical and financial gaps. However, the country is ready for an increase of emergency services in urban and rural centers. India and Bangladesh offer a rich experience of integrating civil protection with the overall disaster risk management and development planning. This includes the growing implementation of Community Based Disaster Management and the involvement of volunteers in rural areas. Cambodia is the less developed country reviewed. However, this ASEAN member has made notable progress in improving its institutional framework. Despite its poverty, Cambodia has demonstrated a great resilience to natural disasters, particularly floods and cyclones. The resilience of Cambodia poor rural communities confirms that poverty and the apparent weak organization of a formal civil protection system don't necessary lead to failure. It is a good study case for cultural factors of resilience, considering that the effects of a protracted conflict are still visible in the country.

Finally, the transfer of capacity is a possible way of lessening the gap between the mature and the semi-structured civil protection system. Countries of the first group have a substantive amount of expertise and experience to share. They can also learn from the most vulnerable ones.

Recommendations

These recommendations summarize the key issues found and indicate areas that may benefit from further research and discussion, to understand the development of civil protection systems in the world. From an applied research perspective and considering the action-oriented approach of the World Bank GFDRR, these recommendations indicate potential areas of interventions that could bring a substantive improvement. Most studies concur that civil protection is a critical public service; moreover, in the context of the increased vulnerability induced by poverty and inequalities, climate change, the depletion of natural resources and conflicts. Strategic recommendations inform policies and the orientation of programs, while tactical recommendations are short-term action points for targeted interventions.

1. **Strategic recommendation 1:** ***Maintain a knowledge base to understand the specific factors that are favorable or unfavorable to the development of civil protection systems in each country and geographical region.***

2. **Strategic recommendation 2:** ***Keep an updated Global Typology of Civil Protection as a practical generalization of civil protection systems into groups with similar attributes. It is a key component of a dynamic knowledge base on civil protection.***

3. **Strategic recommendation 3:** ***Mobilize global efforts to improve civil protection systems, to provide emergency management services to people in a timely, safe and professional way. There is no fail-proof civil-protection system.***

4. **Strategic recommendation 4:** ***Support the work toward establishing a bridge between short-term humanitarian assistance frameworks and the long-term disaster management and civil protection capacity requirements, in the countries with semi-structured or unstructured civil protection systems.***

   Strategic recommendation 5: ***Support an all-stakeholder approach to civil protection, a greater reliance on volunteers in technical functions, particularly in rural and urban communities.***

5. **Tactical recommendation 1:** ***Country in-depth studies should provide a robust and comparable evidence to the knowledge base.***

6. ***Tactical recommendation 2: Support capacity building initiatives aiming at addressing the civil protection gaps, particularly in countries with developing, semi-structured and unstructured civil protection systems.***

7. **Tactical recommendation 3:** ***Actively support financial and technological innovation for emergency preparedness, response, recovery and mitigation.***

Conclusion

This study is one of the most important projects in the field of civil protection in the world. It will serve as a knowledge of worldwide civil protection systems and practices. For example, it could be part of the TIEMS TQC Certification Curriculum.

The literature review and the country-specific case studies will be followed by a citizen survey to measure the level of involvement, participation and satisfaction of communities on civil protection services delivery. The study will be complemented in the upcoming months by an economic analysis of return on investments in civil protection and preparedness. Finally, the study will allow for the identification of institutional gaps, the most beneficial areas of investments, and recommendations of policies and investments to strengthen the civil protection systems, especially in developing countries.

For more information on the study, visit GFDRR website (www.gfdrr.org) to upload the literature review and case studies.

The Authors

Josef Leitmann

Dr. Leitmann is Lead Disaster Risk Management Specialist at the World Bank, heading teams on Resilient Recovery and Urban Resilience at the Global Facility for Disaster Reduction and Recovery (GFDRR). He is also GFDRR's focal point for humanitarian and fragility/conflict issues. Previously, Joe spent four years managing the $400 million Haiti Reconstruction Fund which supports post-earthquake recovery in partnership with the Government and the international community.

He also developed and managed the $650 million Multi Donor Fund to help rebuild after the tsunami in Indonesia. Joe has over 30 years of development experience with the World Bank in disaster risk management, climate change, natural resource management, urban development, forestry, and clean energy. He has worked in over 40 countries and held long-term assignments in Turkey, Brazil, Indonesia, Haiti, and the South Pacific (the latter as a U.S. Peace Corps volunteer).

Dr. Leitmann holds a PhD in city and regional planning from UC Berkeley and a Master's from the Harvard Kennedy School. He is the author of a textbook on urban environmental management (***SUSTAINING CITIES***), co-author of ***INVESTING IN URBAN RESILIENCE*** and numerous articles.

Mare Lo

Mare Lo is a Senior Disaster Risk Management Specialist at the World Bank, GFDRR, the Resilient Recovery Team. He is leading many trusts funds dedicated to strengthening recovery systems, providing technical assistance and financial support for just-in-time post disaster assessments and recovery planning, and promoting knowledge creation and dissemination. He leads the WB global study on Civil Protection and contributes to new strategies to make recovery quicker, better coordinated, and more resilient.

He provides specialized cross-support to Global Practices and national country offices at the World Bank Group.

With over 20 years of national, regional and international experience, at managerial or advisory positions in various sectors, he is working at the forefront of developing proactive strategies, policies and innovative solutions related to resilience to disasters and climate change adaptation. He has demonstrated experience in the formulation and implementation of public policies and programs, institutional and legal framework related to disaster management and its linkages with the development processes.

Before joining the World Bank Group in 2017, he held several high-level positions with the Government of Senegal for 17 years, as Permanent Secretary or Director of Cabinet in

different Ministries, National Director of Civil Protection, First Advisor, Deputy Governor of Region and Prefect of District. As International Consultant on DRR/DRM, he worked with many international and regional organizations like UNISDR, UNDP, ECOWAS Commission and many other agencies mainly in Africa. He is member of the PDNA Roster of Experts of UNDP/EU/WB and has contributed to trainings on Post Disaster Needs Assessment (PDNA) and Disaster Recovery Framework (DRF) methodologies for more than 15 countries and regional economic commissions around the world.

A Senegalese national, Mare has Master's degrees in Natural Sciences, General Administration, Public Finance and Management and International relations. He is fluent in English, French and Wolof, and proficient in Spanish.

USAR/CERTs Capacity Buildings and National Accreditation Process (NAP) of USAR Lessons Learned From China

QU Guosheng

Prof. National Earthquake Response Support Service (NERSS), CEA
Expert Group Leader of USAR of CEA
Deputy General Team Leader of China International Search and Rescue Team (CISAR)
Director, Research Centre of Digital Disaster Mitigation and Emergency Management, IDC, Peking University.
TIEMS Vice President, The International Emergency Management Society (TIEMS)

ABSTRACT

China International Search and Rescue Team (CISAR) had passed IEC in 2009 and IER in 2014 as heavy USAR team depends on INSARAG. During 2012-2015, CISAR guided for the National USARs capacity building of Nepal just before the Ms 8.1 earthquake occurred. After getting the experience of how to capacity building for USARs, and then CEA/CISAR found the expert group of USAR of CEA in 2015. By the guidance of INSARAG and authorized by the INSARAG-Secretaria, FCSS, UNOCHA, the expert group of USAR of CEA make a pilot project for capacity building for domestic USAR teams of China and certificted for two teams under the supervision of CEA. The first heavy USAR team who had passed Chinese-SARAG External Certification (CEC) in China is the Armed Policed General USAR team of Gansu Province under

the leading of CEA in 2016. And the second heavy USAR team who had passed Chinese-SARAG External Certification (CEC) in China is the the Firefighter USAR team of Fujian Province in 2017. Through the studies of the pilot project, the expert group of USAR of CEA had made a capacity building standard preliminary for domestic USAR teams of China, and the core check lists of USARs referenced with INSARAG for passing the Chinese-SARAG External Certification (CEC) for China Provincial or regional search and rescue teams, that called National Accreditation Process (NAP) by UNOCHA INSARAG, and hoping to extend NAP to Asia-Pacific Area. Community Emergency Response Team (CERT) or First Responders is the fourth parts of USARs depend on INSARAG, which origined and developed in Los Angles of USA since 1985. From 2014, CERT concepts drawed into China with the cooperation of FEMA, and through the three years localization and application, the Chinese version CERT fundamental capacity buildings training courses had published. This paper will share the experiences of USAR/CERTs capacity building, and the CEC for the national level USAR teams, and the CERT trainings for CERT members, instructors, and managers, then to support the developing countries to build up their USAR/CERTs systems and capacities, especially along the countries and regions of the Belt and Road Initiatives where with high seismic risks.

I HEARD IT ON THE INTERNET! Common Emergency Management & Business Continuity Challenges

Alex Fullick

TIEMS Newsletter Editor

MBCI, CBCP, CBRA, v3ITIL has been assisting major Canadian organizations initiate and manage customized Business Continuity Management (BCM) programs for over 19 years. He is the Founder and Managing Director of **S***tone***R***oad*, a consultancy and training firm specializing in BCM.

Abstract

Alex Fullick is the host of talk radio show Preparing for the Unexpected on the VoiceAmerica radio network, which focuses on how people, organizations and communities plan, prepare, test, communicate and respond to sudden unplanned events such as natural and manmade disasters and crises.

After a year's worth of episodes discussing topics related to Emergency Management, Business Continuity, Disaster Planning and Crisis Management, as well as other relatable subjects, it's become clear there are common threads and themes that seem to rise to the surface regardless of industry, location or focus for those working to reduce the impacts and suffering caused by traumatic and non-Business as Usual (BAU) events.

These common themes can create issues in all phases of our Preparedness-Response-Recovery-Mitigation phases - or as some would call it - our Plan-Do-Check-Act phases. Regardless of focus, each industry discipline is experiencing the same sets of issues, struggles and challenges, even though they all have the same ultimate goal; to educate and prepare every person, community and organization in the event of disastrous events.

But, what are these challenges facing Emergency Response and Business Continuity professionals and researchers?

The concerns raised by researchers and professionals alike ranged from communications - in all its forms from social media, internal organizational communications to conflicting and confusing terminology to the lack of people and community awareness and understanding. From Lessons Observed being falsely interpreted as Lesson Learned, as there was no action attributed to the observation and finally, to addressing systems over society and common fears.

This session aims to talk about these common challenges and more, with insight and real-life examples provided by Emergency Management and Business Continuity organizational leaders, authors, industry professionals and practitioners, psychologists and researchers. We'll discuss the areas where we can better improve our working relationships within our various vocations and work with those outside of our profession to ultimately create a sense of resiliency for individuals, communities and organizations.

SUBMITTED PRESENTATIONS

(Please, note that all presentations are subject for approval by TIEMS Paper Review Committee)

Jnana Kayal *India*	Seismic hazard microzonation can play a major role in earthquake disaster mitigation
Gerard McCusker *Australia*	Can crisis-hit companies steer the crisis narrative?

Bhaskararao Mulam *India*	Regional Collaborative Strategies for preventing Disaster Risks in South Asia: Need for a better cooperation and coordination among the SAARC member Countries
Bhaskararao Mulam *India*	Regional Collaborative Strategies for preventing Disaster Risks in South Asia
Thomas Robertson *USA*	Applications of Advanced Information Technologies to Disaster Risk Reduction
Neil Dufty *Australia*	A new approach to disaster education
Alex Fullick *Canada*	LIVING IN FEAR: How Emergency Management and Business Continuity Address Common Civilization Fears
Joseph Pollack *USA/France*	Towards a transversal approach to understand Emergency Operations Centres
Zhang Jack and Xu Jia *China*	Research and Application of the Tool of Risk Assessment and Preparedness Improvement Based on Safety Education Scenario Stage Play
Snjezana Knezic *Croatia*	Operational procedures for the long term cultural heritage adaptation strategies against climate change induced disasters
Zhang Jack and Xu Jia *China*	Scenario based Safety-education Stage Play（A+CCDRR）for Primary and Middle School Students in China and its Application
Jie Zhao *China/Belgium*	The Risks and Crises Caused by the Political Power of New Technology
Sandro Bologna *Italy*	From Fortress to Resilience
Yukio Fujinawa *Japan*	Intensive seismic network for the earthquake early warning using mobile phone base station

16th November Conference Preliminary Program

Plenary Session 2
Parallel Technical Sessions
Coffee Break with visit to Posters & Exhibition (30 min)
Parallel Technical Sessions
Lunch with visit to Posters & Exhibition (1 hour)
Summary & Conclusions
Visit to Emergency and Disaster Management Operational Organizations in Manila and Surroundings

Keynote Speakers

The Philippines' Current Strategies in Earthquake Disaster Risk Reduction

The Author

Name: **Renato U. Solidum, Jr.**

Position: **Undersecretary for Disaster Risk Reduction and Climate Change, Department of Science and Technology *and* Officer-In-Charge, Philippine Institute of Volcanology and Seismology**

Organization: **Department of Science and Technology *and* Philippine Institute of Volcanology and Seismology (DOST-PHIVOLCS)**

Dr. Renato U. Solidum, Jr. is a geologist having obtained a BS Geology degree from the University of the Philippines. He finished his M.Sc. in Geological Sciences from the University of Illinois at Chicago and his Ph.D. in Earth Sciences from the Scripps Institution of Oceanography, University of California, San Diego. He has worked with the Philippine Institute of Volcanology and Seismology (PHIVOLCS) since 1984 and became its Director in 2003 up to February 2017. He was appointed Undersecretary of the Department of

Science and Technology (DOST) for Disaster Risk Reduction and Climate Change (DRR-CC) and assigned as Officer-In-Charge of PHIVOLCS since March 2017.

In recognition of his contributions to disaster risk reduction in the Philippines, Dr. Solidum has been awarded the Presidential Citation for Public Service, the Presidential Lingkod Bayan (Civil Servant) Award by the Civil Service Commission, the Professional of the Year in the field of Geology by the Professional Regulation Commission, the Excellence Award for Government Service by the Philippine Federation of Professional Associations and the Presidential Career Executive Service Award by the Career Executive Service Board.

Dr. Solidum is part of many national and global initiatives related to disaster risk reduction. As DOST Undersecretary, he spearheads the department's DRR-CC undertakings with different stakeholders.

ORGANIZATION PROFILE:

DOST is the country's department which provides central direction, leadership and coordination of scientific and technological efforts and ensure that the results are geared and utilized in area of maximum economic and social benefits for the people as stated in Executive Order 128.

PHIVOLCS is the Philippine government organization mandated to monitor and warn, assess hazards and risk, conduct research and development, and formulate awareness and preparedness plans to events related to volcanoes, earthquakes, tsunami and other related phenomena such as landslides.

How to Predict the Next Big Earthquake in Manila? Is it possible? The AMaDeUs Approach

Dimitar Ouzounov[1], Garry de la Pomerai[2], Katsumi Hattori[3]
[1]CEESMO- Chapman University, USA; [2]Soluzion Systems, Dubai, UAE; [3]Chiba University, Chiba, Japan

Abstract

The recent decade of catastrophic earthquakes (EQ) claimed thousands of lives and caused extensive economic losses. The DRR agencies and NDMAs are struggling with the provision of real time early warning systems, let alone earlier detection of potential major seismic events.

In a recent poll by Swiss Re (2014), an international reinsurance company, Metro Manila is the world's second riskiest 'city' in terms of natural disasters waiting to happen, behind only Tokyo-Yokohama in Japan. Assessment was made on to five natural disasters, EQ, storm, storm surge, tsunami, and river flood. About 34.6 million (2013) people are potentially on the receiving end of the five catastrophes. Therefore the questions "How to predict the next Big EQ in Manila" is

more than relevant. The seismically active Marikina Valley Fault System creates a real treat for a large-scale EQ with an estimated M 6–7 and as high as M7.6. (Nelson et al, 2000)
After years of research and development, we are now witnessing the emergence of new realistic inter-disciplinary approaches based on data fusion enabling the reliable forecasting of major seismic events. Whilst still in continuous development, it is now a reality and proven to provide reliable short-term advanced warning. The new approach is a multi-observational data strategy to detect EQ precursors by integrating both satellite observations with ground-based data in order to determine the most relevant signal that provide a pre-EQ warning. The concept is based on innovative methods that were presented in our recent AGU/Wiley Geophysical Monograph Series, describing pre-seismic patterns detection, and on other underlying physical precursors e.g.: radon – gas; NASA numerical assimilation atmospheric models, GPS/TEC ionospheric soundings and thermal satellite observations recorded by NASA/NOAA/ESA/JAXA satellites (Ouzounov et al, 2018). We use these inputs for an initial physical representation of the interactive process between the EQ source with the Earth surface and the ionosphere. An example of a connection between EQs with the ionosphere is the Lithosphere Atmosphere-Ionosphere Coupling model (LAIC) to detect the pre-EQ signals.

Scientific aspects
In recent years, there has been an increasing amount of encouraging evidence that, during the last stages of the long term tectonic preparation process for an impending EQ, there could be a transfer of energy and/or particles between the lithosphere and the overlaying atmosphere, resulting in coupled processes commonly known as LAIC (Pulinets and Ouzounov, 2011). LAIC due to seismicity is one of the most promising physical concepts we use for this research. It is developed on a novel but an integrated process that takes into account multiple natural activities of the EQ preparation process in its latest stage (one-two weeks before the seismic shock). The atmospheric (thermal and ionospheric) anomalies observed by the remote sensing satellites for recent major EQs confirmed LAIC estimates of large spatial scale of occurrence; short live temporal dynamics (several hours up to several days) and altitude dependence in distribution. The estimated release of thermal energy implies that the air ionization process is the primary source driven by the alpha radioactivity of radon.

Technological aspects
Almost all Earth observation satellites (EOS) have been developed to study other phenomena than EQs, such as, to mention some, weather forecast, monitoring of land usage, global warming, and air and water pollution. However, we found the input of EOS critical in the understanding coupling between different geospheres associated with the time of major EQ preparation, We designed a sensor web called **AMaDeUs** (A Multi-sensor Web system for Pre-EQ signals Detection, Utilization and Alerts) of existing satellite sensors (Terra, Aqua, GOES, POES, MSG and others, Figure 1) and ground observations e.g., Global Positioning System Total Electron Content (GPS/TEC), radon, air temperature, relative humidity, aerosol. Our rationale for using these observations is that there are insufficient spatial and temporal coverage of any one of these observations.

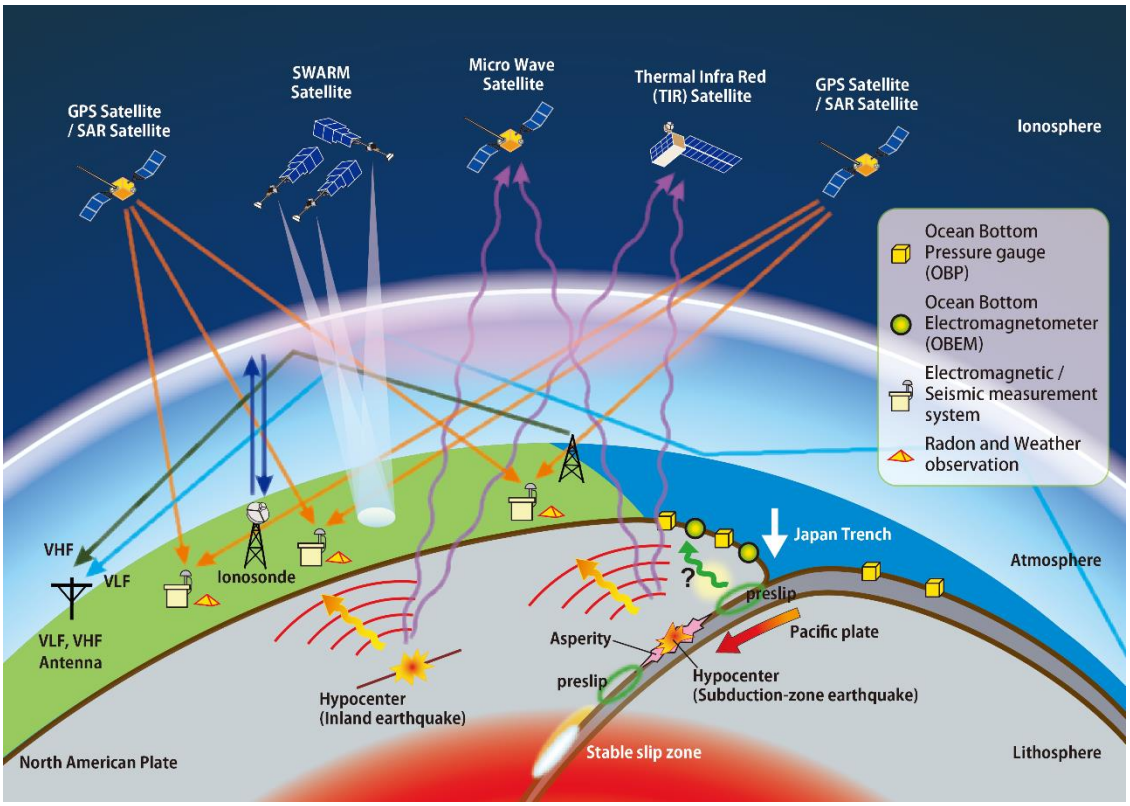


Fig.1 AMaDeUs - conceptual diagram for Geospace and ground observations of pre-EQ signals, case study for Japan

The technological advantage the new approach **AMaDeUs** is to enable multiple and already validated physical measurements to be fused into one framework with the latest theoretical models like LAIC (Lithosphere-Atmosphere-Ionosphere Coupling) and to provide feedback on data gaps, which may then be acquired from other sources. Global observations based on remote sensing technologies, would exploit the unique advantage of space observations of pre-EQ phenomena, namely the possibility of providing the opportunity of using both deterministic and statistical techniques to study databases containing many more seismic events than traditionally studied in EQ sciences. The abundance of data could hopefully balance the challenge represented by an analysis, which necessarily links different disciplines in order to understand diverse physical effects and interactions, starting from lithospheric geophysics, seismology, tectonics and geochemistry, through atmospheric and ionospheric physics, up to the Earth's magnetospheric physics.
The ground-breaking nature of proposed **AMaDeUs** approach is (1) by using novel physical hypotheses for EQ preparation process to build a Sensor web based for multidisciplinary observations, (2) through synergetic analysis to identify seismically related anomalies associated with lithospheric - atmospheric - ionospheric parameters, and (3) to use them as early warning information for major seismic events. To our knowledge such type of science approach for short-term assessment (days/ hours in advance) for reduction of seismic hazard in the major seismic zones has never been demonstrated before.

Practical aspects
The significance of these initial AMaDeUs forecasting alerts will be presented over Japan (2012-2013) where we been alerting for the large EQ events M>5.5 (Fig 2). During the tested period 75 alerts been issued, 51 EQ (63%) occurred in the alerted regions, and we have 24

(37%) false alarms. We also present real case of forecast for case of M7.3 of December 7, 2012, Japan occurring in the water over Japanese trench. Our analysis was able to alert 14 days in advance for a potential EQ with M> 6 (Fig 2. Right, bottom). AMaDeUs was revealing an unique temporal-spatial evolution pattern in an EQ preparation process, which has also been seen in other major EQ timelines in Central Asia and South America. AMaDeUs tests in different region lead to successful alerts for the M8.3 of Illapel, Sept 16, 2015 Chile EQ and for M7.3 Nepal, May 12, 2015.

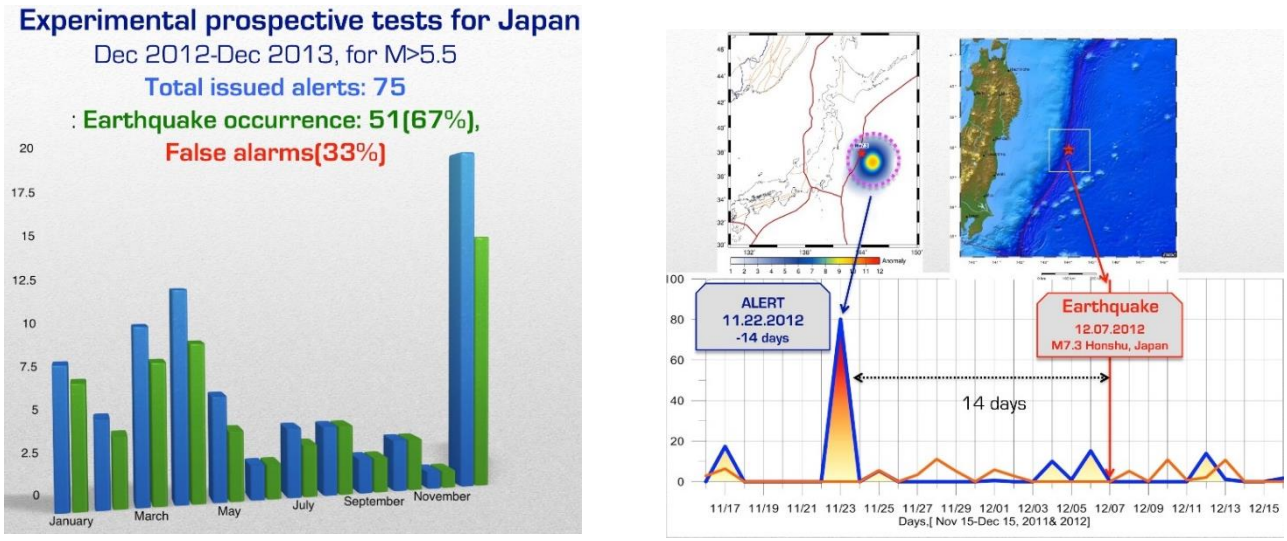


Fig.2 Initial operational testing of AMaDeUs. (Left) One year (2012-13) histogram of monthly EQ alerts (blue, total 75 alerts) and real EQ occurrences related the alerted events (green, 67% success). (Right) represent one EQ case of forecasted evens included into the 2012-13 tests. The M7.3 of December 7, 2012, Japan was alerted 14 days in advance. The detection map is shown and the navigation map (Top). (Bottom) The time series of 30 days show the thermal anomaly in atmosphere (blue line) occurred (11.22.2012) and for comparison the same analysts was preformed for the same period for 2011, and show no anomalies when no seismicity is occurring (orange).

Conclusions

The new observation capabilities in monitoring from ground, earth-space and geo-space, coupled with advances in data analysis and theory, provide opportunities as well as additional challenges. Beyond the science of providing reliable short-term forecasts, the presentation will also highlight the core of these challenges, including: identifying a social science strategy to re-educate the users to receive reliable forecast information; the integrating and reliance upon advanced real time early warning alarm systems; and the preparedness training at all levels of society from Government to Industry to Home, will also be an essential part of any strategy for a full implementation of a comprehensive Early Warning System, which will maximize the potential usefulness and necessity of the developing reliable seismic forecast technology, potentially as a 'New Early Warning'.

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The Authors

Dimitar Ouzounov

Dr. Ouzounov is Associate Professor in Geophysics at the Chapman University, Orange, CA, USA and his research topics are: pre-earthquake phenomena, Earth's lithosphere-atmosphere coupling, and short term earthquake forecasting using space technologies. Previously, Dimitar spent a decade as researcher at NASA Godard Space Flight Center, USA, where he developed original concept for studying thermal transient radiation in atmosphere from space in relation to pre-earthquakes processes. Dimitar became a guest- investigator for the French DEMETER (2004-2010) satellite and currently for the new Chinese/Italian CSES (2018) satellite mission dedicated to study the Earth electromagnetic environment associated with earthquakes and volcanoes. His research in Earth's lithosphere-atmosphere-ionosphere coupling unlocked a new phenomena of how geospheres interact in association with mega earthquakes and with other natural disasters. In the geophysics, he is recognized for applying an interdisciplinary sensor-web methodology for time-dependent assessment of earthquake hazards and short-term earthquake warnings. As an invited speaker he attended UN, UNISDR, IDRC-Davos, Kansai Forum (Japan), International school of Physics (Italy) and NASA conferences. He is a member of leading geophysical societies and coordinates various international initiatives on utilizing space-borne observations for earthquake hazard mitigation.

Dr. Ouzounov holds a PhD in Geophysics from Schmidt Institute of Physics of the Earth, Russia and M.Sc in Applied Geophysics of University of Mining in Geology, Bulgaria.

He is leading Editor for the new monograph *PRE-Earthquake Processes: A Multidisciplinary Approach to Earthquake Prediction Studies*, co-author of forthcoming book *The Possibility of Earthquake Forecasting: Learning from nature* and author of numerous articles.

Garry de la Pomerai

Independent DRR consultant to UNISDR, UNESCO, UNCRD pioneering since 2005 the Safe Schools Strategy; Resilient Cities. Programme; INRULED Education for Rural development and sustainability; IFRC led workshops proposing use of legislative mechanisms to support integration of DRR. Also pioneering PPPs applying technology front line to implement solutions. Since 2009 assisted development of Seismic Early Warning Systems strategy and technologies within China and initial system into Nepal. Also supporting international seismic forecasting Scientists team developing implementation strategy and social science applications. Since 2011 adopted Magnetic Technologies Dubai to provide water resource enhancement within Agriculture, Industry and Domestic; simultaneously promoting within the UN that Water Resource Management be an individual priority within DRR and Political agendas as the potential nemesis for mankind; Including atmospheric modification 'Praesidium' incorporating combating air pollution over cities, rain enhancement and dissolving fog. Chairman of UNESCO Global Task Force for the Built Environment. Co-founder of the Coalition for Global School Safety. Member of UNISDR GADRRRES. UNICEF MENADR.

Katsumi Hattori

Dr. Hattori is a Professor at Graduate School of Science, Chiba University, Chiba, Japan. He holds the doctoral degree (Engineering) from Graduate School of Engineering of Nagoya University, Japan (1992) and became a Research Associate at Department of Engineering, Toyama Prefectural University, Japan. In 1995, he became an Lector at Gunma National College of Technology, Japan; in 1997, a researcher at International Frontier Research Project on Earthquakes (Team Leader), Institute of Physics and Chemistry (RIKEN), Japan; in 2001, an Associate Professor at Marine Biosystems Research Center, Chiba University, Japan; in 2006, Associate Professor at Faculty of Science of the same university; in 2009, a full Professor at Graduate School of Science, Chiba University, Japan. Currently he is engaged in research relating to short-term forecasting of natural disasters such as earthquakes, volcano eruptions, landslides, etc. based on electromagnetic approach. He is a member of International Union Radio Science (URSI), American Geophysical Union, European Geoscience Union, IEEE, The Institute of Electronics, Information and Communication Engineers, Society of Atmospheric Electricity of Japan, and Society of Geomagnetism and Earth, Planetary and Space Sciences. He was a President of Society of Atmospheric Electricity of Japan (2015-2016).

Title and Abstract of Speech will be provided soon.

SUSANA G. JUANGCO, RN, MPH

Director SUSANA GONZALES JUANGCO is a graduate of Bachelor of Science in Nursing at the Emilio Aguinaldo College. She had finished her Master in Public Health at the University of the Philippines. She is now pursuing her Doctoral in Public Health at the same university. She had attended several trainings both local and international in the field of health promotion, risk communication, heath emergency and disaster management and disaster risk reduction and management. She had her certificate courses on Health Promotion for HIV AIDS at Curtin University in Australia and Risk Communication in Malaysia.

Director Juangco had been involved in the development of several training courses in Health Emergency Management like Risk Communication, Emergency Medical Technician-basic, Public Health in Emergency Management in Asia and the Pacific, Basic Life Support among others. She is also one of the authors of the Training module on Risk Communication of the World Health Organization and the Epidemiology for the Laboratory Technician and Laboratory for Epidemiologist by CAREID. Both training modules are being used by the ASEAN countries.

Director Juangco has also been involved in the development of several reference materials on health emergency and disaster management while she was employed at the Health Emergency Management Bureau of the Department of Health. Likewise, she was one of the TWG who had established the post graduate course on Master in Public Administration major in Health Emergency Management as a collaborative partnership between Bicol University and the DOH.

Director Juangco is one of the technical member representative for the Philippines to the Open - ended Intergovernmental Working Group on Indicators and Terminologies relating to Disaster Risk Reduction and Management. She is also a member of the TWG who went to Cuba and Japan to learn about their best practices on DRRM and how it can be adopted in the Philippines.

At present she is holding the position of Director III at the Capacity Building Service of the Office of Civil Defense, where she spearheads the development of standards on Disaster Risk Reduction and Management Training Courses and the establishment and institutionalization of the National Disaster Risk Reduction and Management Institute or the NDRRMC.

Abstract

Philippines Economy is growing at 6% to 7% annually. This growth is primarily fuelled by the large sector of Small and Medium Size Enterprises (SMEs) which contribute about 35% to 45% of the economy in the country. About 90% of business enterprises can be classified as SMEs in the country, which are spread out in the nation to supply the needs of the local community and provide products and services to large enterprises. This sector needs to be aware and has to prepare their businesses mitigate the impact of disaster threats and vulnerabilities to ensure continuity of operations.

The Department of Trade and Industry (DTI) of the Philippines' SME Resilience Survey Report in 2016 shows that 40% of the SMEs business outage takes about 1 to 4 weeks. This prolonged outage contributes to the difficulty of the local economy to recover. In the same survey, 59% of SMEs potentially will lose US$10K to US$50K because of business outage after a disaster. This number is very much significant and will strain the resources of Local Government Units (LGUs) to fuel back the economy. In most local economy the ability of the community to recover depends on how fast the businesses get back on its feet. There were some provinces and municipalities today (i.e. Tacloban Leyte after Typhoon Haiyan) that are still unable to recover economically because of the SMEs inability to cope up and operate their businesses again.

The PSI index for would allow SMEs to prepare their businesses identify the current ability of their business to recover during a disaster. It would be able to show the maturity of the SMEs and the amount of effort or investments require to mitigate and respond to disaster threats. The index will revolve on the most important component of resiliency, its "People". Allowing the SMEs to understand the organization and the ability of human resources to recover and respond to disaster. It will also look at "Supply Chain" which is very critical to SMEs as most of them are connected to a limited supply of products and services in each local economy. The inability of a single SME will affect the entire local economic business value chain. It will also touch on information or data availability to demonstrate simple tools and technology to allow SMEs access to information for their businesses that will provide continuity of business operations.

The Index will be a joint study and collaboration with National Resilience Commission, Humanitarian Leadership Academy and ARISE Philippines. These are partner organization of BCMAP.

The Author

Ramil "Mel" Cabodil
President

Business Continuity Managers Association of the Philippines (BCMAP)

Mel Cabodil is the current Country Manager of Technology Support Services in IBM Philippines. He leads this business unit of over 100 IT Professionals from various Service Partners to provide technology support to IBM and non-IBM equipment in the country. IBM is largely the IT platform and services used by majority of the key business enterprises in the Philippines.

He is also the President of the Business Continuity Managers Association of the Philippines (BCMAP). An advocacy group of Business Continuity Practitioners to help prepare enterprise in the Philippines be more resilient.

He used to be the Consulting Practice Leader for IBM-Global Technology Services in ASEAN. He was responsible for the development of Infrastructure Consulting Business in the region, leading a group of Associate Partners for Systems Services, Resiliency, Mobility and Network Services. He managed solution development, design and delivery of the consulting business working with the Sales team to ensure that a healthy backlog is in place and working with the Delivery team for successful delivery of the engagements.

His experience and competency led him to various management roles in consulting, sales, pre-sales, project delivery and general business management. He has multinational exposure having been part of various ASEAN roles. He has led Architects, Consultants, Project Managers and other IT practitioners from various countries to deliver IT solution in the region.

His passion for Business Continuity and Disaster Recovery and the need for the Philippines to have a more resilient business infrastructure prompted him to organize a non-government organization of Business Continuity Management Practitioners. He is the founder and the current President of the Business Continuity Managers Association of the Philippines (BCMAP). This is a membership organization of BC/DR Practitioners in the country affiliated with the Disaster Recovery Institute International (DRII) of USA and The Business Continuity Institute (BCI) of UK.

He has established DRI Philippines, a local affiliate of DRI International in the country. DRI International provides training and certification for Business Continuity Professionals globally.

Mel is an Electrical Engineer from Mapua Institute of Technology in the Philippines and has gone thru various International Executive Development Programs with IBM, Symantec and Microsoft

Venue and Hotels

TIEMS 2018 Annual Conference will take place at the University of Santo Tomas University.

University of Santo Tomas

The University of Santo Tomas is one of the top four universities in the Philippines and is consistently ranked among the top 1000 universities in the whole world. UST is both timeless, owing to its more than four hundred years of quality Catholic education, and timely, as it continuously responds to the needs of the present.

The University of Santo Tomas (UST) is the oldest existing university in Asia. In terms of student population, it is the largest Catholic university in the world in a single campus. The institution was established through the initiative of Bishop Miguel de Benavides, O.P., third Archbishop of Manila. On July 24, 1605, he bequeathed the amount of one thousand five hundred pesos and his personal library for the establishment of a "seminary-college" to prepare young men for the priesthood. Those funds, and his personal library, became the nucleus for the start of UST and its library.

The founding of the University of Santo Tomas followed on April 28, 1611. With the original campus located in Intramuros, the Walled City of Manila, UST was first called Colegio de Nuestra Señora del Santisimo Rosario, and later renamed Colegio de Santo Tomas, in memory of the foremost Dominican Theologian, St. Thomas Aquinas.

Rooms can be booked at Manila Hotel at a favorable rate or at other hotels close to the venue.

Manila Hotel *(http://manilahotel.website/)*

TIEMS has reserved 50 rooms at Manila Hotel, which can be booked by conference participants until 13th September at a favourable rate. After 13th September 2018, TIEMS cannot guarantee availability nor the favourable rate at Manila hotel. The booking form is found below:

Please, fill out and send the form to the Mr. Adrian Salumbides – Sales Manager, The Manila Hotel with

e-mail: *a.salumbides@themanilahotel.com*

Prices at Manila hotel is as follows:

- Superior Deluxe King/Twin bed and including breakfast: (Php 6,500.00 nett per room per night): Additional Php 2,500.00 nett for extra person (with breakfast already and extra bed).

Manila Hotel is a beautiful 5-star hotel in Manila less than half a mile from iconic Intramuros and half a mile from Manila Cathedral. The hotel provides free Wi-Fi access and facilities like in-house dining options, a business center and an outdoor swimming pool.

The rooms are elegantly decorated and provide guests with a flat-screen TV, air conditioning and a sitting area. Featuring a shower, the private bathrooms also have a bathtub and a hairdryer. The suites have an iPod docking station, bathrooms fitted with Italian marble and a senso memory foam mattress. Some rooms have views of Manila Bay, and others have views of the city.

The Mabuhay Palace restaurant serves authentic Cantonese dishes, and The Champagne Room provides French delicacies. There is also Cafe Ilang-Ilang which serves Asian food. Guests can also relax in The Tap Room Bar or in the lobby lounge. Alternatively, enjoy a refreshing drink by the Pool Bar. The hotel's deli services light snacks and drinks throughout the day.

Other facilities at the hotel include a fitness center and a spa. The spa provides a variety of massages.

The hotel is located half a mile from Palacio del Gobernador, and Ninoy Aquino Airport is 5.5 miles away. The property provides free parking for guests' convenience.

There will be arranged a bus transport from/to Manila hotel and UST for participants staying at Manila Hotel

M

THE MANILA HOTEL

Event Title: **TIEMS ANNUAL CONFERENCE 2018**

Room Accommodation:

Full Name of Guest/s:
1. _____

2. _____

Bed Type: Superior Deluxe King/Twin (Php 6,500.00 nett per room per night): _____

*Additional Php 2,500.00 nett for extra person (with breakfast already and extra bed)

Email Address: _____

Check-in date:_____ Check-out date:_____

Credit card number:_____ Expiry date:_____

Transportation:
Van – Php 2,250.00 per way
Car – Php 1,140.00 per way
Airport pick up (Airport to The Manila Hotel) – YES___ NO___
Type of Vehicle:_____
Flight Details(Flight number and ETA):_____
Airport drop off (The Manila Hotel to Airport) – YES___ NO___
Type of Vehicle:_____
Flight Details(Flight number and ETD):_____

*Please take note that the credit card information will be used to guarantee the reservation. Payment will be done upon check-in. A confirmation letter will be sent to the email address provided for the reservation. Free cancellation 2 days prior arrival of the guest, after that, credit card will be charged for 1 day room charge for late cancellation or no shows.

*Bed type is upon availability.
*For inquiries you may contact:
Mr. Adrian Salumbides – Sales Manager, The Manila Hotel
E: a.salumbides@themanilahotel.com
T: 632 527 0011 loc 1107

University of Santo Tomas Accommodation

TIEMS has also reserved 19 rooms at UST.

The Hotel 1611 has no link for public access since it is meant for the University guest. It is located in the 5th floor of the BGPOP/ Alumni Center; and there are 12 rooms.

In addition, it is also the Domus Mariae Residences, which is located inside the campus near the Architecture building, about a meter away from the BGPOP building. It is meant for UST international guests/students so rate is cheaper but likewise with limited 7 rooms.

TIEMS will come back a link for booking and deadline for holding the rooms reserved.

HOTEL 1611
UNIVERSITY OF SANTO TOMAS

CTHM Campus Training Laboratory Hotel

ROOM NUMBER	TYPE	VIEW	RATE	GUEST PER ROOM
501	Deluxe Twin	Pontifical View	PHP 4,200.00	2
502	Deluxe Twin	Pontifical View	PHP 4,200.00	2
503	Deluxe Double	Pontifical View	PHP 4,300.00	2
504	St Thomas Two Bedroom Suite	Pontifical View	PHP 7,500.00	4
505	Deluxe Double	Pontifical View	PHP 4,300.00	2
506	St Hyacinth One Bedroom Suite	St Hyacinth Suite	PHP 6, 500.00	2
507	Deluxe Twin	Tamarind Ville View	PHP 4,200.00	2
508	Deluxe Twin	Tamarind Ville View	PHP 4,200.00	2
509	Deluxe Double	Tamarind Ville View	PHP 4,300.00	2
510	St Dominic Two Bedroom Suite	Tamarind Ville View	PHP 7,500.00	4
511	Deluxe Double	Tamarind Ville View	PHP 4,300.00	2
512	Royal One Bedroom Suite	Tamarind Ville View	PHP 6, 500.00	2

Note:

- Rate includes breakfast
- Extra guest: Php 1,000.00 with breakfast
- Plated Breakfast – Extra order at Php 200.00/ person

Domus Mariae International Residence

Domus Mariae International Residence



History

The three-storey building, which formerly housed the old printing press, was converted into a dormitory in 1997 to accommodate international students and foreign visitors.

Part of the former Residence Hall of International students has been converted into a campus training hotel in a bid to boost hospitality programs in the university.

CTHM proposed the renovation of the dormitoru in 2010. The Domus Mariae International Residence was renovated to cater to the various courses of Hotel and Restaurant Management (HRM) and Travel Management (TM) programs that require a venue to stimulate actual industry operations.

The campus training hotel is located at the second floor of the Domus Mariae. It has a front desk, a management office, a laundry room, and a glass-walled demonstration room. There are 6 guest-rooms: two Deluxe Twin, two Deuxe Double, one Deluxe Single and one Suite Room (St. Hyacinth Suite).

It was named Domus Mariae, a Latin term for the "House of Mary" in honor of the Blessed Virgin Mary.

Room Types	Rates
St. Hyacinth Suite	P 2,000 / night
Deluxe Twin	P 1,500 / night
Deluxe Double	P 1,500 / night
Deluxe Single	P 1,500 / night


St. Hyacinth Suite


Deluxe Double


Deluxe Twin


Deluxe Single

Services and Amenities in your room:

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Dorapower has served more than 2,000 elementary and middle schools in China and aims to be the leading company in the campus safety-education company in China.

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One Complementary Registration*) at TIEMS Annual Conference	X		
Two Complementary Registrations*) at TIEMS Annual Conference		X	
Three Complementary Registrations*) at TIEMS Annual Conference			X

Please, contact TIEMS President for interest: *khdrager@online.no*

Pictures from the Philippines

TRAVEL INFORMATION

The Philippines is a popular tourist destination for business travelers and conference attendees.

ENTRY REQUIREMENTS

All travelers from foreign countries have to go through Immigration on arrival in the Philippines. Most travelers, including citizens of the EU, Argentina, Australia, Belgium, Cambodia, Canada, France, Indonesia, Israeli Nationals (59 days), Italy, Malaysia, Netherlands, New Zealand, Norway, Qatar, Republic of Korea, Russia, Saudi Arabia, Singapore, Spain, United Arab Emirates, USA and Canada, can enter without a visa with just their passports for 30 days. Check, if you are eligible for visa-free entrance on the website of the Philippine Foreign Affairs: https://www.dfa.gov.ph

Other nationals are advised to contact the Philippine Department of Foreign Affairs at 02-556-000 or 02-234-3488 for visa requirements.

TRANSPORTATION

Public transportation in Metro Manila, Philippines is provided by light rail, rapid transit, commuter rail, bus, jeepney and taxi-cab. E-hailing services Uber and Grab provide taxi-like services. Hotels also provide pick up services from the airport to the hotel. Travel from the airport to the Manila Hotel and nearby hotels will take around 30-60 minutes depending on traffic.

MEALS

Filipinos are well known for their masterpiece cuisine. Sample the fresh lumpia (spring roll), chicken sotanghon, beef mechado leche flan, chicharon, lechon, bibingka, kare kare, pansit, etc. There are many excellent restaurants in Manila.

MONEY/ BANKING

There are lots of cash machines. Credit cards may be used in hotels, restaurants, international airlines and shops. Changing foreign currency for Philippine pesos is legal only at banks, currency exchange desks at hotels, and licensed exchange booths. It is better to bring US dollars.

General safety rules apply - do not flash large sums of money and never exchange currency with private people - it is illegal and with high probability is a scam.

CASH

There are cash machines around that would allow to get money with credit or debit cards (carrying Master Card/Visa logo). However, we would recommend using a bank for this purpose.

EXCHANGE RATE

Euro to Philippine Peso (as of April 8, EUR = 64.01 Philippine Peso PHP)

https://themoneyconverter.com/eur/uah.aspx

U.S. Dollar to Philippine Peso (as of April 8, U.S. = 52.04 PHP)

https://themoneyconverter.com/usd/uah.aspx

FOOD

Buying your own food in shops is a reasonable alternative to eating in cafes/restaurants. There are some grocery shops around the conference facility. Check with the Hotel Concierge for location. Western foods are available in Manila upscale shops. Philippine specialities to try from grocery and shops:

- Chocolate bars (SM Malls, Robinsons)
- Bread & Pastries (Goldilocks, Red Ribbon, etc), the kind that is sold in the markets is a totally different from what is sold in shops
- Meats/Chicken (Max's Chicken, etc.)

SOUVENEIRS

Souveniers are available in many shops (SM Malls, Kultura Shops).

LANGUAGES

English and Pilipino are the two main languages spoken in the Philippines. The Philippines has 8 major dialects such as, Bikol, Cebuano, Ilonggo, Ilocano, Kapampangan, Pangasinan, Tagalog and Waray.

Most essential Tagalog words with English Translation:

Good morning:	Magandang Umaga
Good evening/night (greeting):	Magandang Gabi
Goodbye:	Paalam
Thank you:	Salamat po
Yes:	Oo
No:	Hindi
Please (to accompany a request):	Pack
Excuse me (to apologize):	Pasensiya na po
What is the price of this?:	Magkano ito

USEFUL TIPS

Time - PHT (Philippine Time)
Current Offset: UTC/GMT + 8 hours
Difference: 12 hours ahead of New York USA

Business hours - usual working hours in offices/institutes are 9.00-17.00 with the lunch break at 12.00-13.00, Monday to Friday. Most common opening time for smaller shops is 10.00-19.00, Monday to Saturday, sometimes 10.00-18.00 on Saturday. Larger shops and most cafes work 10.00-20.00 with no lunch break, every day including official holidays. Most bank branches work 10.00-18.00, Monday to Friday, lunch break at 12.00-13.00 Saturday 9.00-14.00.

UTILITIES

Electricity standard is 220 volts, 50Hz. An adapter may be needed for Western European appliances and a voltage converter for Northern American.

Tap water in the Philippines is chemically safe but drinking bottle water is recommended.

LOCAL TRANSPORTATION TO THE CONFERENCE VENUE

Most transportation during the conference will be made by foot (if the venue is at the Manila Hotel). However, a bus will be provided as a means of transportation if the conference venue will be at the UST. Taxis, Grab or Uber is inexpensive and convenient. Taxi can be hailed while Uber or Grab may be ordered by phone.

MEDICAL FACILITIES

We ask all participants to get adequate medical insurance for the whole period of their stay in the Philippines. TIEMS do not have any insurance for participants and will not be able to provide any financial assistance in case of any emergency.

Hospitals for medical care in the Philippines provide good standard of care by Western standards. Basic medical supplies are available in state and privately-owned and very numerous private pharmacies (drugstores). Many drugs that are sold in the Western countries solely with a doctor's prescription can be bought without any prescription and much cheaper. The

Philippines is a country with well-trained doctors. Numerous private clinics exist including western-type clinics with Western and English-speaking medical staff. Philippine doctors in public and private hospitals will expect cash payment for their services. Hospitals would accept applicable foreign insurance, such as Blue Cross Blue Shield.

SAFETY TIPS

Despite some highly publicized crime stories, the Philippines is very safe. However, usual safety tips applicable to any country should be taken into account: watch your possessions; do not go to deserted locations after dark; do not drink with strangers; if you intend to go out and drink alcohol leave your documents and valuables at your hotel (take a passport photocopy with you). Do not flash your money/thick wallets/credit cards, do not engage in street gaming or take money or wallets that are not yours from people who say that they found them; do not change currency with private persons.

PHILIPPINES FACTS

- The Philippines is a Southeast Asian country in the Western Pacific
- Comprise of 7,100 to 7,500 islands depending on whether it's high or low tide, making it the second largest archipelago in the world.
- Fifth largest English speaking nation behind the U.S. India, Pakistan and the U.K.
- Filipinos love basketball. The Philippine Basketball Association (PBS) is the 2nd oldest in the world after the NBA (Huffpost).
- Filipinos also love boxing and when Manny Pacquiao "PacMan" fights, the Philippine national Police report that street crime drops to zero in Metro Manila (Huffpost).
- The Philippines is the only Asian nation that is predominantly Christian with around 80% Roman Catholic).
- Filipinos are very sociable and spend lots of time sending text messages. It is estimated that Filipinos send about 400 million text messages daily or 142 billion texts per year, also known as the "texting capital of the world" which is more than total number of daily text messages sent in the U.S. and Europe (Huffpost).
- The Philippine Island of Palawan has been named one of the best island in the world by Conde Nast Traveler and Travel & Leisure. Puerto Princesa is a UNESCO world heritage site and 2nd longest underground river in the world.
- Filipinos love to shop at their shopping malls such Mega Mall, Mall of Asia and other SM Malls.
- Politeness is considered an art form and culture in the Philippines. Filipinos respect their elders e.g. seniors are addressed as "po" after please, thank you and other exchanges.

CHECKLIST FOR PARTICIPANTS

- Passport;
- Invitation from the organizers (scanned or faxed version is sufficient);
- Talk transparencies/poster;
- Photocopy of the passport - title and visa pages;
- Voltage converters/adapters - if needed;
- Phone numbers and addresses of your airline and embassy;

- Printout of the necessary information.

For other information contact

TIEMS PRESIDENT

CALL US
K. Harald Drager
+47 91 69 30 12

EMAIL US
khdrager@online.no

TIEMS SECRETARIAT

CALL US
+32 2286 8038

FIND US
Rue Des Deux Eglises 39, 1000 Brussels, Belgium

EMAIL US:

Secretariat@tiems.info

2018 TIEMS Host Point of Contact:

Angeli Medina MPA, BSN, CBCP, CHPCP

angelism60@gmail.com

4TH ICCE CONFERENCE IN MEMORY OF THE WENCHUAN EARTHQUAKE

Pic.1 the guilded conference hall in Chengdu

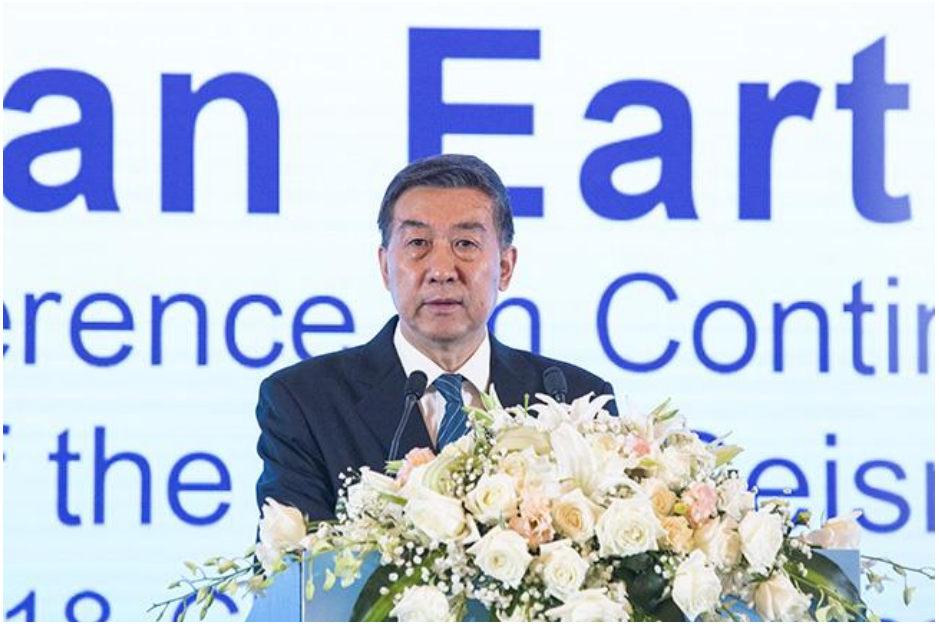
The 4th international conference on continental earthquakes was dedicated to the memory of the Wenchuan Earthquake, one of the greatest earthquakes in recent memory and a pivotal moment in response and recovery.

Its magnitude of 8.0 at a shallow depth caused exceptionally severe ground-shaking. Compounded by the relatively small proportion of properly strengthened buildings, a highly populated and mountainous area, the Wengshuan earthquake cause innumerous secondary disasters such as landslides, mudflows, rock falls and thousands of building collapses and critical infrastructure damage including on roads, electricity, water supply, sewage, telecoms, artificial dams, and the Zinpingpu reservoir. This resulted in an unusually high number of deaths: over seventy thousand by conservative estimates, over one hundred and twenty five thousand if we also consider lost people.

This required a unprecedented response from China and the rest of the world. China's disaster relief acquired many new characteristics, backed by top-level management, such as the "people-first" "open-information" approaches, volunteer teams and offering financial, psychological and medical aids from China and abroad. It's reconstruction financing innovation was probably the most significant innovation in our field. Indeed it makes sense to take stock and inventory what we have learnt and what we could still learn as an international community.

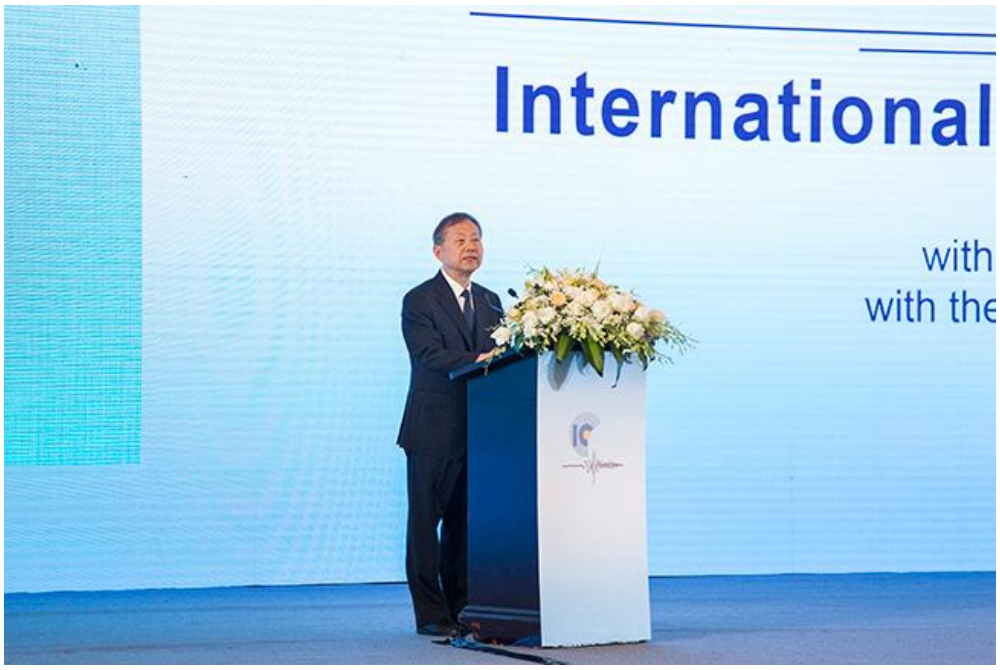
Pic.2 where attendees could havea VR experience of the earthquake damaged area, see the ChinArray early warning system and earthquake safety innovations in nuclear and railroad.

It's no wonder then that the 4THICCE conference was extremely well attended by thousands of practitioners and academics from at least 80 countries (if not more!). The conference focussed on the exchange and cooperation in earthquake science and technology, countermeasures for earthquake DRR, emergency response, and post-earthquake rescue, relief and recovery.



The conference opened with a speech by Prof. Guoguang Zheng, Vice-minister of China's newly integrated ministry of Emergency management. He explained the evolution in the Chinese approach from ex-President Xu Jintao 2008 laws for protecting and mitigating against, and

restoring and reconstructing after earthquake disasters to today's President Xi Jing Ping's integrated civil protection ministry. This newly created ministry integrates emergency management and resilience activities hitherto dispersed in over 30 different ministries. It's expected this will create efficiencies in planning, coordination and response and generally improve response and recovery processes. As prof. Zeng noted, this modernisation will not only benefit china, but through international scientific cooperation and among the Belt and Road initiative countries, will benefit the sustainability and safety of many other countries.



Attendees then recieved an inspiring speech by the Schezwan Province Governor Yin Li and party leader. In his speech he highlighted the critical importance of civil-government cooperation, and the international cooperation that saved lives and livelihoods. These were key to saving lives and were of critical importance for the province's recovery. In particular he highlighted the beneficial role that international collaboration had on its response and recovery. He invited conference attendees to consider further collaboration both through newly launched scientific initiatives and through economic initiatives.

Pic 5-6. Mr. Lund (SE) from UNOCHA INSARAG and Mr. Harald Drager, President, TIEMS

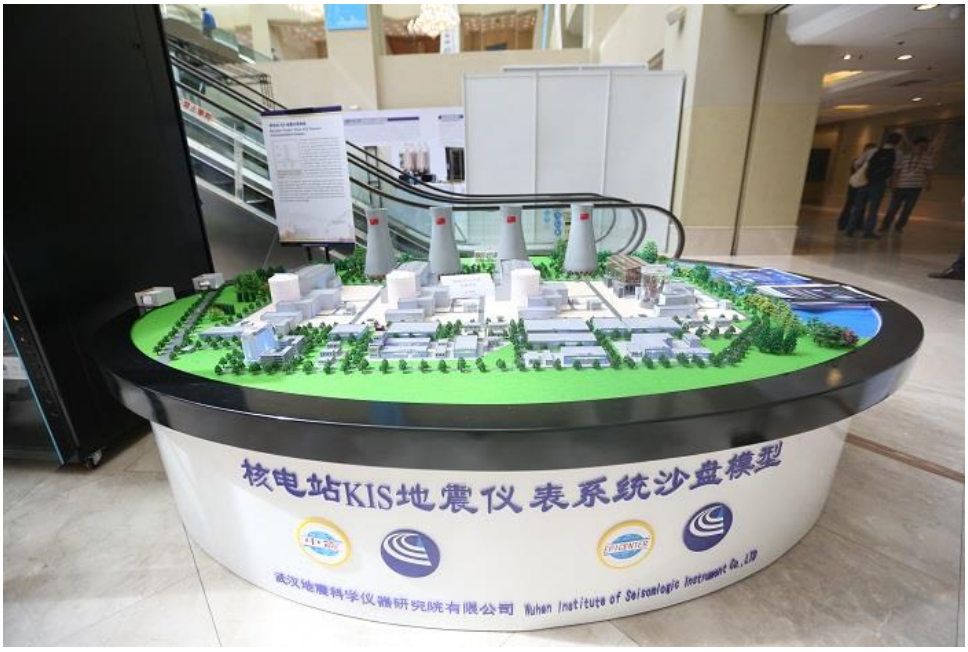
TIEMS was present as a co-organiser for the emergency response tracks with OCHA, INSARAG, and the China Earthquake Administration (CEA). The first session TIEMS attended was on national USAR capacity and team certification. The audience enjoyed an invited talk by Jesper

Lund representing OCHA on global quality standards. He was followed by Mr. Stanislas Rouquayrol the humanitarian military attaché for the French Foreign Ministry with a talk on coordinating response to earthquakes in France and abroad. Our very own Prof. Guosheng Qu provided a comparative analysis and evaluation of lessons learned of the USAR certification process in China. This session closed with a rewarding talk by Mr. Yasushi Nakajima on the integration of medical support to Urban SAR team capacity in the Japan Disaster Relief Team. After a short break, our president, Harald, presented TIEMS' forthcoming education network; Prof. Chen Hong presented capacity building for SAR in China (they are much above the international standard already!); JP Monet compared C2 systems and their interoperability; and Meen Chhetri reviewed the disasterous international response to the 2015 Nepalese earthquake. Other noteworthy TIEMS participations include a talk by JP Monet on the use of robotics and civilian emergency response and SAR; Prof. George Markowsky's talk on the Missouri area earthquake preparedness; and Harald's talk on new approaches to emergency and disaster management from a global perspective. Interesting presentations and posters deserve a mention, especially China's recently inaugurated ChinArray a sensor network for earthquake monitoring and warning, the VR experience of the affected area, and Prof. Max Wyss's near real-time loss estimates system which may prove central for response planning in the future.

TIEMS had the pleasure of being invited to the Chengdu provincial university for a special day focussed on emergency management. We were welcomed by the Chengdu Party Secretary whom gave us with an inspiring speech about the importance of collaboration in building back and recovering after the earthquake. This session was highly interesting including presentations of the Singapore Civil Protection, Malaisia's response organisation, Australia's USAR capacity building, and the Chinese volunteer corps.

To close the conference, the CEA kindly arranged a special excursion for TIEMS members to the "showcase city", a city ravaged by the earthquake that was not rebuilt in order to preserve the memory of the earthquake. This was a fascinating and touching monument to the destructive power of nature, and really immersed us in the consequences of one of China's most devastating earthquakes.

After the conference, TIEMS was invited to the CEA in Beijing for a seminar on DRR and cooperation after earthquakes. This meeting was attended by the CEA practitioners. It was a perfect opportunity to share experiences in capacity building and training for SAR and INSARAG. We ended our session with an exchange and presentation of honors. UNOCHA INSARAG honors were bestowed on the the CEA for excellence in capacity building. The French Foreign ministry also bestowed honors on the CEA for best-in-class international cooperation in civil protection affairs.

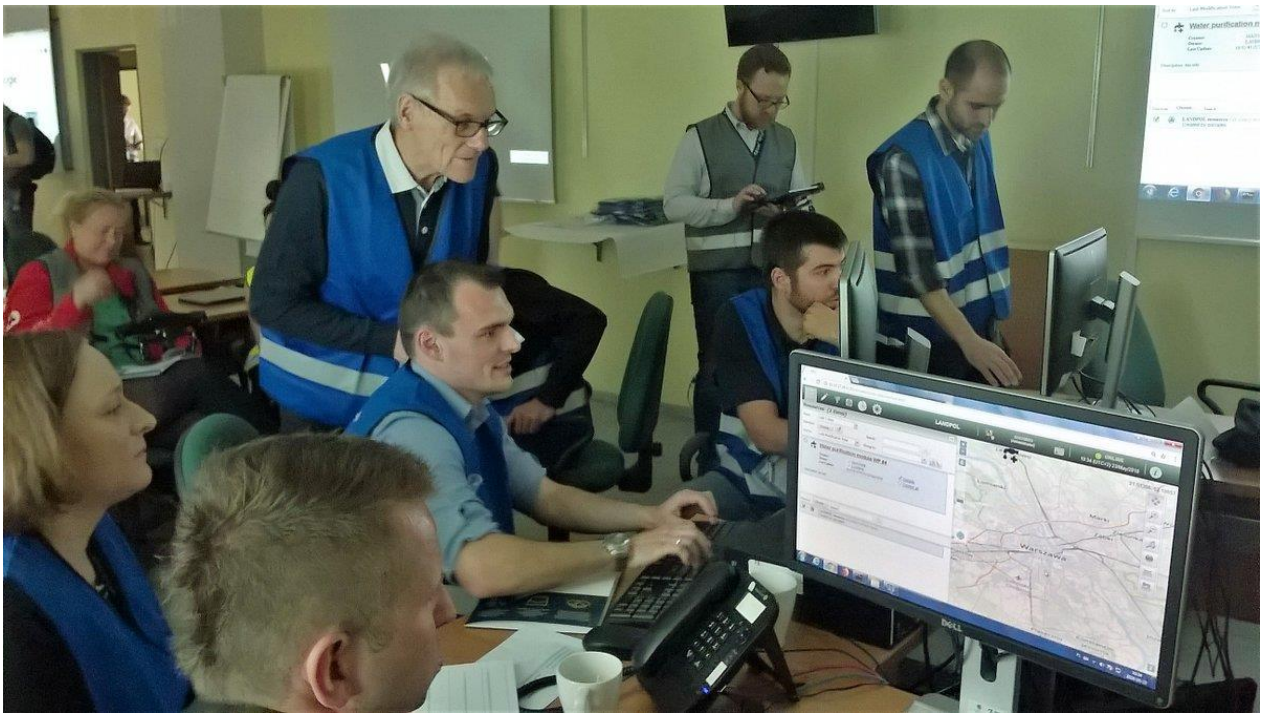


Pic 9. Floatation and water-based earthquake safety engineering innovation from China in partnership with EDF (FR)

In closing, the 4THICCE provided a unique opportunity for the international exchange of experience and better practices. It was a chance for us to reaffirm our commitment to international cooperation and collaboration in humanitarian affairs. It was a rewarding inter-disciplinary and inter-organisational learning experience. And for those of us lucky enough to have attended it was a valuable and touching opportunity to experience world famous chinese hospitality and schezwan cuisine.

DRIVER+ PROJECT ANNOUNCEMENT

Trial #1 uncovers new solutions for a more integrated crisis management at EU level



On 21-25 May 2018, a major milestone for the EU FP7 project DRIVER+ (Driving Innovation in Crisis Management for European Resilience) was passed, when the first of four Trials was held at Poland's Main School of Fire Service (SGSP) in Warsaw. Over 60 participants from all over Europe, including practitioners from civil protection authorities, solution-providers and experts, joined forces to assess Crisis Management (CM) solutions in a realistic - and challenging - scenario. The question on everyone's lips was: In a cross-border environment, could a more integrated high-level CM system deliver improved situation assessment and coordination, and improve how resources are pooled and shared between agencies?

Three solutions were trialled in the DRIVER+ Test-Bed virtual environment: Socrates CO / Centre of Operations (by GMV, Spain); 3Di (by Nelen & Schuurmans B.V., NL); Drone Rapid Mapping (by Hexagon Safety and Infrastructure, Poland). While Socrates CO provides the essential Common Operational Picture (COP) at EU level for emergency services, the others extend the depth of information available to incident commanders: 3Di allows simulation of a flood given the geography of the affected area, and Drone Rapid Mapping creates a highly detailed 3D digital model of an area using video imagery by a drone.

To assess if these solutions could improve CM operations, a serious chemical spill was simulated: 2.5 million cubic metres of toxic fluid inundating the surrounding area, with 15 fatalities and seriously affecting the nearby population and potentially spilling into neighbouring countries. Using a systematic but pragmatic methodology, practitioners were able to trial the applicability and effectiveness of the solutions, when responding to a disaster requiring trans-border coordination. They could also simulate how to adapt their response to an emergency based on the changing dynamics of a major flood. This was followed by a field-based trial, at SGSP's Field Training and Rescue Innovation Base, to demonstrate the applicability and effectiveness of Socrates CO, as well as Drone Rapid Mapping, which

create orthophotos and 3D maps of an affected zone from a drone flight, giving practitioners a geometrically accurate view of the area.

An overall evaluation of Trial #1 is ongoing, and will be available soon on the DRIVER+ web-site (see below). In the meantime, you can view a video of Trial #1 on the Driver+ web-site. Trial #1, like Trials #2-4 and the Final Demonstration, will lead to further development of a pan-European Test-bed, providing a unique opportunity for transformative change in terms of assessing innovative solutions in resilience and CM.

Mark your calendar!

- Trial #2, to be held in October 2018 in Valabre (France), will consist of a forest fire, threatening wildland urban interfaces in a Mediterranean environment. Capability gaps to be addressed include interoperability, common understanding and coordination in response operations. If you wish to participate, as an observer or evaluator, please contact cooperation@projectdriver.eu. Follow the latest news on Trials #3-4 and the Final Demonstration, at the DRIVER+ web-site (below).
- On 3-4 September 2018, DRIVER+ will organise the 3rd Innovation for Crisis Management (I4CM) event in Warsaw, which will provide a platform for CM practitioners, solution providers and policy makers to meet and exchanges on best practices and lessons learned. For more details, and to register, visit:

  http://www.driver-project.eu/events-2/3rd-i4cm/

For more information:

http://www.driver-project.eu/

A HOLISTIC APPROACH TO LONG TERM SHM OF TRANSPORT INFRASTRUCTURES

Vincenzo Cuomo[1], Francesco Soldovieri[2], Felice Carlo Ponzo[3], Rocco Ditommaso[3]

1. **Institute of Methodologies for Environmental Analysis (IMAA), National Council of Research (CNR), Tito Scalo, Italy**
2. **Institute for Electromagnetic Sensing of the Environment (IREA), National Council of Research (CNR), Napoli, Italy**
3. **School of Engineering, University of Basilicata, Potenza, Italy**

Abstract

In the last years, the development of monitoring systems for critical transport infrastructures is gaining an increasing interest, as pointed out by the scientific literature and the significant number of recent research project regarding this specific topic. Therefore, as first topic, the present article discusses about the necessity of holistic approaches/visions that are based not only on the integration of different sensing technologies, but more important on a multidisciplinary approach encompassing disciplines related to the sensing, ICT, positioning technologies and civil engineering to properly assess existing infrastructures. Afterward, this contribution will provide a brief survey of the different classes of sensing techniques of specific interest for the civil engineering. In this general frame, attention is also focused on the embedded miniaturized sensors, which have the main advantage to ensure an always updated long term monitoring and provide a more reliable early-warning system. Finally, it is evident how the concepts here specifically considered for transport infrastructures can be easily extended to monitoring other kinds of critical infrastructures, urban areas (built environment) and cultural heritage.

1. INTRODUCTION

In the last years, the critical transport infrastructures have experienced (especially bridges) significant safety criticalities, which in few cases led to collapse with significant social and economic impacts [1]. These criticalities are due to different causes, such as: ageing; low quality and misconceptions of the design; not proper use of the technologies in the construction; low quality of materials; lacking of insufficiency of a reliable maintenance planning; not reliable awareness of the hazards; overload respect to design data; underestimation of the performances of the structure due to a non updated knowledge of the healthiness status, collocation in unsuitable sites. In several cases, these causes operate in synergy to each other (cascading effect) so to exacerbate their effects.

In this context, Structural Health Monitoring (SHM) is a necessary tool in order to provide information, which can support the strategies for increasing the life-time of the structure, correctly planning maintenance interventions, so to ensure safety conditions of the infrastructure under any environmental condition and hazard occurrence. Several significant advantages result from the use of SHM.

First of all, SHM provides a really useful support to the decisions in order to perform a proper (reliable and economically sustainable) maintenance planning, by ensuring real-time or quasi-real-time updated information about the health status of the infrastructure. It is worth noting that this information is important also for the management of crisis events, due natural and anthropic causes; in fact, SHM provides a multi-layers system of information about the structure just before the event and this, jointly with the information about the crisis events, can drive the first recovery interventions.

Furthermore, starting from the knowledge of the initial state of a monitored structure, SHM techniques allow to evaluate possible variations about the state of the healthiness of a structure, even without using specific information about components and materials. As example, by exploiting the initial status of the dynamic behaviour (in terms of the fundamental oscillating frequency, related damping factor and mode shape with its geometric curvature), it is possible to quickly evaluate possible damage state comparing the instantaneous modal parameters with the reference state (initial status).

Moreover, SHM could be used to perform a real-time update of the structural conditions by using global safety indicators for fast assessment of criticalities, also related to hazards and environmental conditions strictly correlated to the site where the infrastructure is located.

Therefore, SHM is able to support the stakeholder in giving answers to questions, such as: what operations are required to secure infrastructure? What are performance losses? Keeping in mind that economic resources are limited, how to identify the prioritization of interventions? How to define strategies of ordinary and extraordinary maintenance?

In order to get this goal, SHM has to manage the information regarding the infrastructure and the site where the structure is located, as well as the interactions between the structure and the site. Figure 1 depicts the main causes of the structural degradation as due to the external causes and aging.

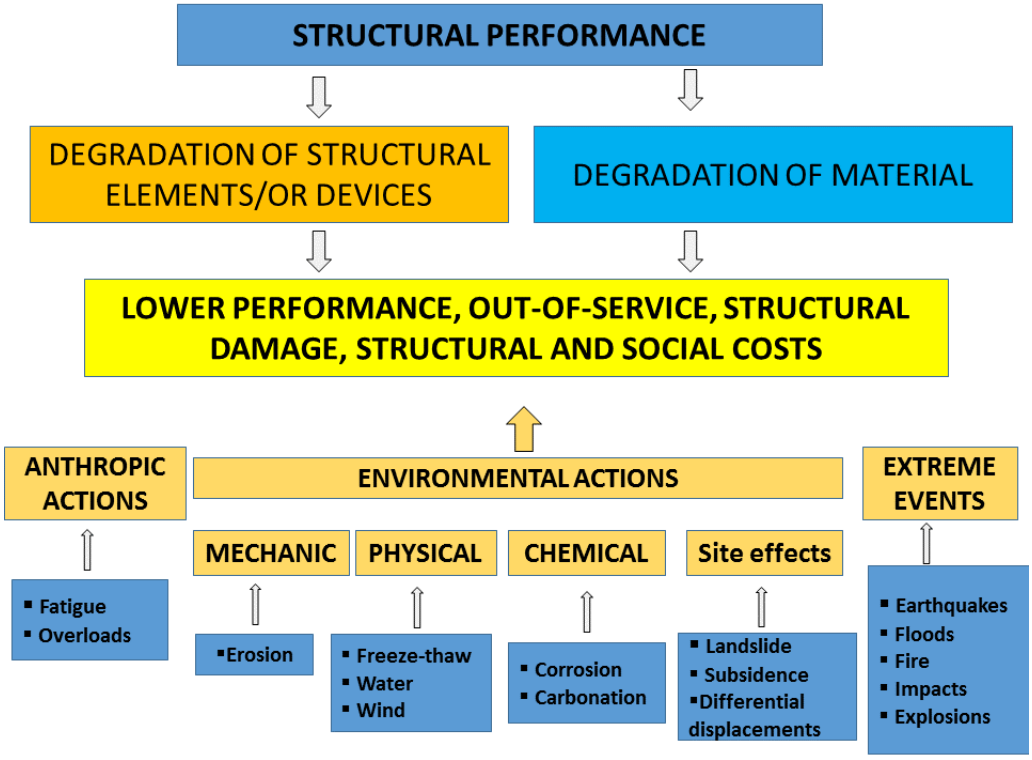


Figure 1. Performance losses depending on the combined effect of the aging and environmental issues

In light of the issues depicted in Figure 1, SHM can support engineers to detect:

i) causes of variation of structural mechanical characteristics due to the aging of structure and material degradation in a multi-effect scenario (pollution, climate change, overloads,..);

ii) damages related to the anthropic actions or environmental actions (characterized by both slow dynamical features, as in the case of slow differential displacements at low scale, slow progression landslides, subsidence, long term impacts of climate change, and fast/very dynamical features as in the case of earthquakes, impacts, explosions,.....)

iii) effects of interactions between site and infrastructure, local amplification of seismic waves due local geological/geotechnical characteristics of soil.

In the last years, there has been a disruptive evolution of monitoring technologies and automatic techniques for data analysis, by exploiting technologies coming from fields different from civil engineering [2]. The challenge is to make these technologies fully operational, also by making the stakeholders aware about their performance.

In fact, the issue of degradation and damage of transport infrastructure (roads, rails and roadbeds, bridges, viaducts, tunnels, etc.), notably under adverse meteorological conditions and in presence of hazards, requires the integrated use of sensing technologies (from ground, airborne and satellite), positioning technologies, ICT tools (web sensors and web services data, Internet of Things), monitoring and control technologies typical of structural engineering. Afterward, all the technological indicators (provided by sensing techniques) have to be assimilated in structural modelling. Long-term management mainly relies on the continuously updated knowledge of the degradation phenomena, which, in some cases are due to slow dynamics (aging, fatigue, subsidence, differential displacements, slow landslides).

Accordingly, a SHM system should have capabilities of monitoring of the territory, in which the infrastructures are located (wide area surveillance), and be designed by considering specifically the features of the infrastructure (as design, materials, properties of the sites where they are located, age, etc.).

The evolution of EO techniques (both satellite based, airborne and ground based), of positioning and of ICT has permitted the development of an advanced "tool box", whose elements are selected and used at different stages of the monitoring [2]. In fact, these technologies can be activated, in a logical and temporal workflow, by starting from the cheapest ones to the more expensive and sophisticated ones depending on the characteristics and criticalities of the infrastructure.

By this way, it is possible to detect criticalities at their early stages, optimize the planning of ordinary and extraordinary interventions, by increasing the lifetime of the infrastructure and saving management cost during the overall life of the infrastructure (see figure 2). In this context, a key role is played by the assimilation of monitoring data into structural engineering models, which allows at evaluating performances losses in order to prioritize interventions.

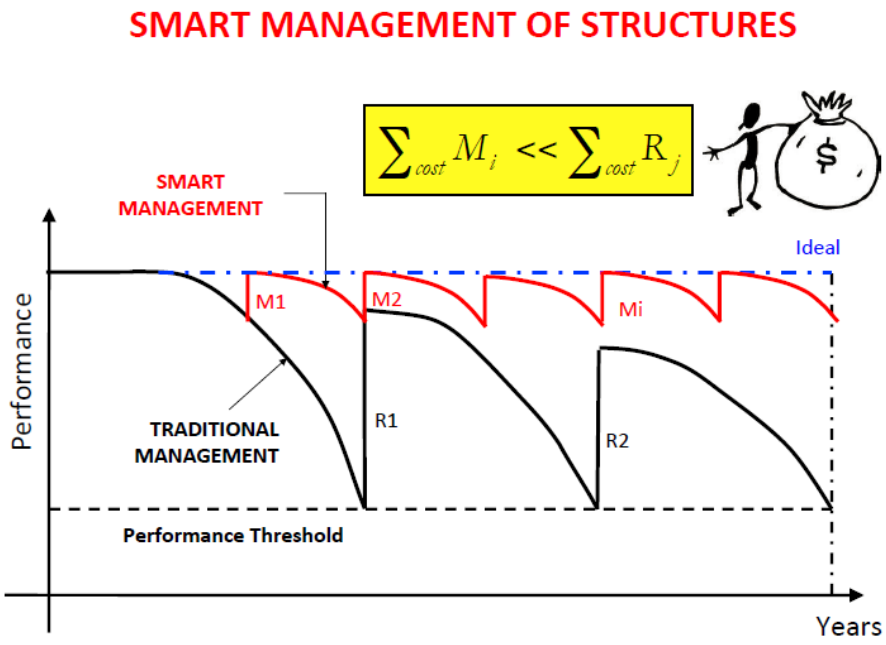


Figure 2. Monitoring as a key element of a smart management of structures

Therefore, this paper is organized as follows. In Section 2, a general concept of the architecture of monitoring system is proposed. Section 3 presents a brief state art of monitoring technologies included the embedding technologies and vibrational inspection methods. Conclusions end the paper.

2. ARCHITECTURE OF AN INTEGRATED MONITORING SYSTEM

The solution here presented is based on advanced SHM technological solutions coupled with civil engineering analysis methodologies and modelling tools, able to provide the stakeholders with a really useful information for the its necessities.

The integrated approach is organized according to several stages exploiting different sensing technologies, which are organized according to a temporal and logical workflow. Here, as illustrative example of the functionality of this integrated system, we present the monitoring procedure for the particular case of a bridge situated in an area with seismic hazard. In this case, the workflow is organized according to four levels of observation and knowledge, where the information gained at a level is used to decide whether to activate the next level.

Level 0 of the workflow aims at identifying and archiving information, at a global scale, about the characterization and the history of the infrastructure and the site where they operate. Firstly, a database is created: it includes all available information about the history of the infrastructure starting from the design documents up to the historical analysis of the infrastructure (as the year of construction and of completion of the works, possible past maintenance and retrofit interventions, effects of aging, etc.) and the definition of a comprehensive classification of anomalies/damages (from the less dangerous to the heaviest ones) observed in existing structures on the basis of the data gathered during the actual management (as and where available). This database can be complemented and enriched through specific actions planned in the other levels.

Ultimately, in Level 0, the information about the hazard of the area where the infrastructure is located will be acquired as well as the exposure of the structure on the basis of historical data (e.g. seismic or hydrogeological risk, subsidence and so on.). Exposure is evaluated considering the consequences that the interruption of service of the transport infrastructure has in normal conditions and in a post-event scenario, and the impact that a given damage state of the structure has on the related economic and social activities based on the full serviceability of the structure. A number of suitable economic and social indicators (daily traffic, proximity to urban areas, presence of alternative routes, etc.) can be used to estimate the exposure of each single infrastructure. The hazard will be evaluated by considering all the specific factors (seismic, flood, hydrogeological, etc.), which could affect the infrastructure in combination with aging. The structure will be positioned within the relevant hazard maps to identify the probability, likelihood, or frequency of the event for each hazard.

Starting from Level 0 results, and after that the relevant bridge has been focused as a structure needing attention, Level 1 is activated.

In **Level 1**, for the investigated bridge, critical situations will be identified and characterized by significant changes in the key structural parameters, which can be detected by means of the combination of remote (wide area surveillance made possible by satellite based optical and radar observations) and fast and low-cost in-situ sensing techniques (i.e., accelerometers for fundamental frequency identification), which can enable a characterization of the site and of the infrastructure. The dynamic behaviour of the bridge can provide a “reference status”, with respect to which quantify the evolution of the infrastructure (damage), while information on relative displacement retrieved by satellite radar surveillance can be easily correlated to damage on the deck and/or columns and foundations. These techniques can detect damages due to force loss on pre-stressing cables, corrosion of reinforcing bars, concrete carbonation, aging, movements due to landslide or subsidence and so on. Structural dynamic and displacement information can be combined with the visual inspections and/or periodic monitoring of significant damage evidences, by using non-invasive technologies (as thermal camera, Ground Based Synthetic Aperture Radar, Ground Penetrating Radar, optical fiber, just to quote few technologies) in a cascade approach (from cheaper technologies to more expensive ones depending on the obtained results). If the results show that the infrastructure might have criticalities, Level 2 is activated.

In **Level 2**, a careful planning of in-situ tests will be activated on the basis of the structural characteristics of the bridge, in order to achieve the highest level of knowledge and to obtain a reliable estimation of the seismic risk index related to different limit states and the potential cost to reduce the risks. The deepening of the level of knowledge will be carried out by combining classic, such as in situ testing on structural materials, and innovative techniques, such as 3D Laser-scan, GPR surveys, vibrational measurements by using arrays of sensors, ground based interferometric radar, optical displacement monitoring, electrical resistivity tomography. Technological indicators will be assimilated into simplified models in order to have a rough evaluation of the vulnerability of the infrastructure, by taking into account the impact of seismicity. If the risk is medium-high or high, the last level 3 will be activated.

In **Level 3**, the infrastructure will be continuously monitored in order to have continuous information of its status, including early warning of further criticalities. In case of medium-high risk level, the global and local safety levels will be assessed by using complex numerical models suitably calibrated against the in-situ tests results; by this way, the loss of performance with respect to design performances will be evaluated in order to decide and plan the interventions to be done. The methodology of the proposed study provides a reliable picture of the coupling of aging with the seismic vulnerability and allows at identifying the critical parts that need interventions to reduce the risk, including closure.

Summarizing, the system should ensure the following functionalities: i) allowing for the continuous diagnostics of the infrastructure state, ii) assessing its vulnerability, iii) certifying the quality and reliability of rehabilitation interventions, iv) providing early warning of deterioration in order to activate the interventions before the situation becomes critical, v) providing quick damage assessments in crisis events.

The significance of the smart maintenance structure is shown in figure 3, where the depicted scheme points out the necessity of a monitoring capable of two main functionalities as long term structural healthiness monitoring ad quick damage assessment, after crisis events as earthquakes, floods, landslides. The other main key factor in this scheme is the assimilation of the monitoring results in the structural modelling for a continuous and detailed diagnosis of the status of the structure and its vulnerability assessment. The results of the modelling, enhanced by the results of the monitoring, should be after provided to the stakeholders under the form of a support to the decisions for the subsequent interventions, which can range from the traffic load limitation to the demolition and successive reconstruction.

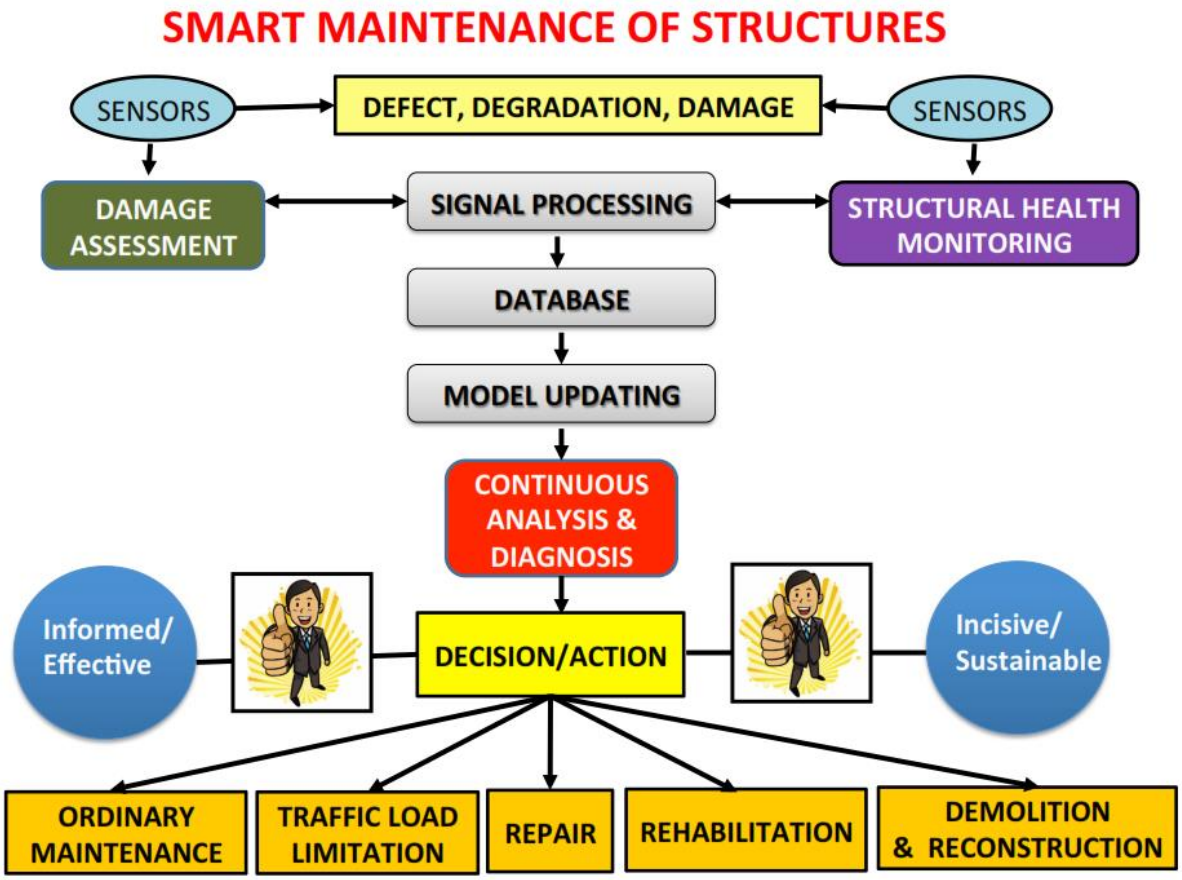


Figure 3. The general workflow for the smart maintenance based on improved SHM

The details of the data processing workflow for supporting decision is shown in figure 4, where the role and interaction of the monitoring system and the structural modelling are well pointed out in order to enable smart maintenance and rehabilitation strategies.

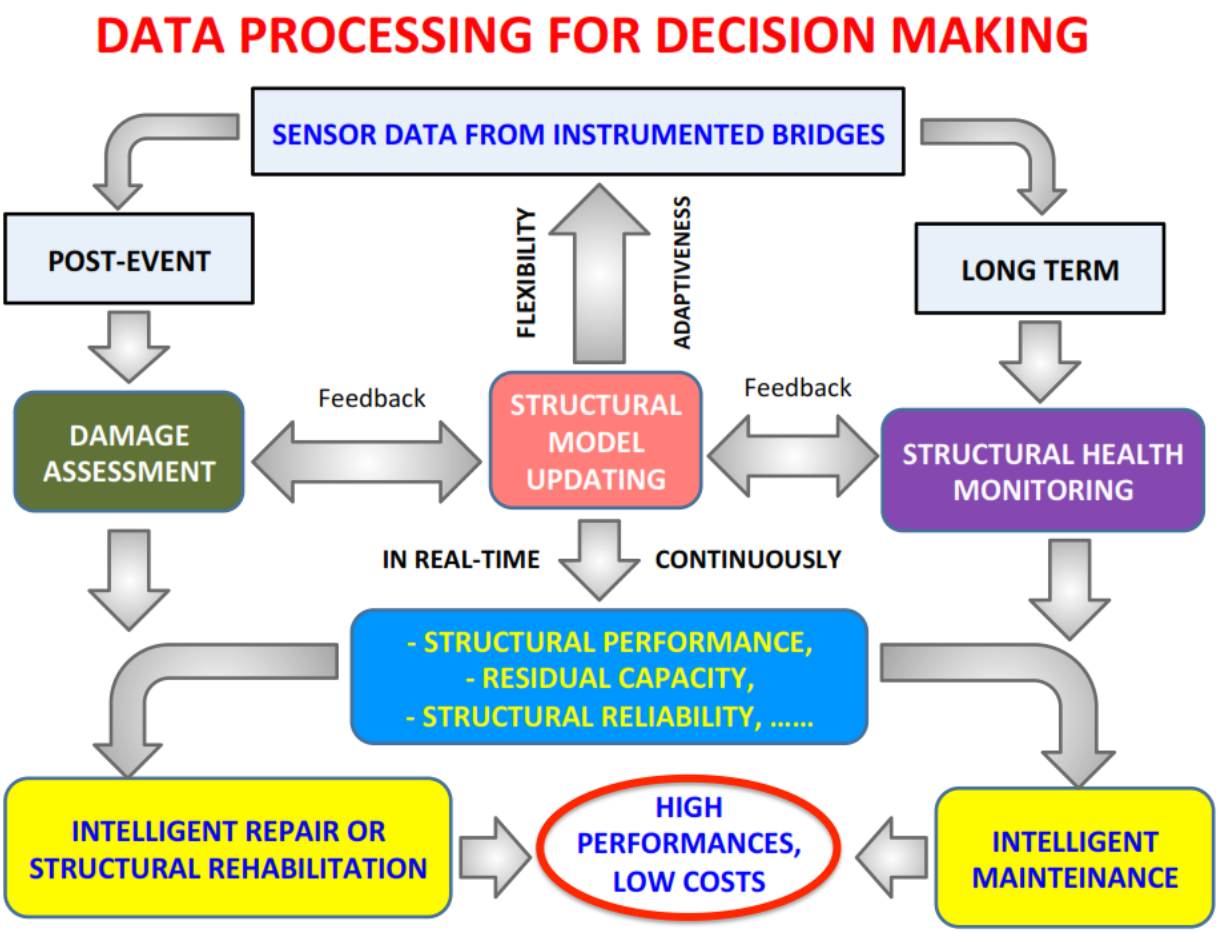


Figure 4. The data processing for decision support

3. STATE OF ART OF THE MONITORING TECHNOLOGIES

3.1 Global vision of the structure and the embedding territory via satellite and airborne observations

In the last decade, there was a disruptive evolution of Earth Observation.

For sensors operating in the optical band, the manufacturing approach has been changed radically with the consequence of a sharp reduction in costs. Satellite and expendable launchers are no longer considered as prototypes. Standardization processes have been promoted together with industrial mass production processes. Low cost constellation of mini-satellites have been developed with capabilities to reach sub metric resolution, while improvement of revisit time can be obtained simply increasing the number of satellites. Important ICT companies as Google entered into Earth Observation activities and the minisatellite SkySat is the smallest and cheapest satellite ever designed with capability to achieve imagery with resolution smaller than one meter.

In the last decade, new generation of Very High Resolution (VHR) Synthetic Aperture Radar (SAR) systems has been developed, in particular TerraSAR-X and COSMO-SkyMed, capable to measure millimetric surface displacements with the spatial resolution of few square meters.
SAR technologies allow to have all weather day and night imagery covering, for each map, hundreds or thousands of square kilometers, where it is possible to measure the relative displacements of the soil and

structures, with a spatial resolution that can reach one meter. If the spatial resolution is larger than few tens of square meters, it is possible to observe large-scale (wide area surveillance) dynamics and to characterize the site where the infrastructure is located (for example, presence of subsidence or slow moving landslides). In the case of VHR, it becomes possible to measure the millimeter displacements of the single parts of the infrastructure (with a spatial resolution of some meters) and then to identify criticalities such as the failure of the foundations, the collapse of one of the pre-stressing cables, the breakage of the joints, etc. It is important to remind that this kind of data are available from the early nineties for wide area surveillance, even if with a worse spatial resolution, so that it is possible to gain information about the history of the displacement of the site.

In the last years, the use of satellite (optical and radar) data have been improved thanks to two European Union flagship programs, such as Copernicus (http://www.copernicus.eu/) and Galileo (https://www.gsc-europa.eu/), which are enabling new generation advanced services based on space technologies. Copernicus aims at environmental and security monitoring. Copernicus exploits the heritage of GMES (Global Monitoring of Environment and Security) and is a program driven by users' needs. Copernicus exploits the added value of integration of satellite data (provided by the "Space Infrastructure") with ground based and airborne data (provided by the "In Situ Infrastructure"). The flagship program EU Galileo allows to obtain metric positioning, thus strongly improving traceability. Nowadays, it is possible to have a free and open access to Copernicus data (SAR spatial resolution in the order of hundreds of square meters, revisit time 6 days.). In fact, Copernicus Data Policy is based on Free and Open Access to Data with a significant cost effectiveness of the related solutions. The use of basic Galileo services will be free and open to everyone and enables two different kinds of services for infrastructure monitoring. The first one is based on the improved use of GPS in order to directly monitor transport infrastructures; the second one exploits the possibility of having a metric-level positioning of mobile sensorial platforms, which are used identify possible changes to the infrastructure, specifically the status of the pavement.

The monitoring of urban areas has been assessed in [3], where the satellite radar data have been used to monitor the deformation of the single structure. The use of Cosmo-Sky MED has been proved as an effective tool for monitoring of single transport infrastructures, in particular bridges, in the area of Potenza city (Southern Italy). In this case, the use of tomographic approaches to SAR processing data has allowed the monitoring of the thermal behaviour (displacements) of the Musmeci bridge, with spatial resolution of the few meters [4].

At present, one of the main challenge is the development of new generation services able to exploit the added value of the integration of Earth Observation Technologies with Navigation ones and Information technology.

In addition, people are constantly connected to each other in ubiquitous networks and utilize devices that, although they are not born as sensors, continually give information like true monitoring devices. So new concepts of operation in monitoring are going to be developed as "sensors no sensors" and "the citizen as a sensor". As an example, smartphones (or better the GPS and accelerometers in the smartphones) can be used in an integrated way to measure the "regularity" of a road or to estimate the intensity of seismic events. In future, the impact of ICT is going to be further increased due to the recent advances in High Performance Computing (HPC), Internet of Things (IoT) and the growth of connectivity.

3.2. Technologies for material and structure characterization

The investigation of the structure can be performed by considering two main classes of in-situ sensing techniques aiming at obtaining information about the surface and the inner of the structure.

3.2.1. In-situ sensing techniques for structure characterization

The possibility to achieve information about the inner part of the structure and the underground is possible thanks to the combined use of geophysical techniques, mainly Ground Penetrating Radar (GPR) and Electrical Resistivity Tomography (ERT) as well as ultrasonic (US) techniques, just to quote the most used sensing technologies.

GPR is a well assessed radar technology, which has been largely deployed in many realistic cases for: diagnosing and monitoring the status of rebar layers and cracking detection in presence of long-term degradation issues [5] and after crisis events [6]. The use of advanced data processing, based on reconstruction approaches, exploiting microwave tomography [7], has improved the interpretability of the GPR surveys by ensuring a high-resolution 3D rendering of the imaged scene [8].

ERT is a methodology able to estimate the spatial distribution of the electrical conductivity of the investigated area. In its more simplified configuration, ERT is based on the injection of the current in the structure (or in the underground) and the measurement of the induced voltages between the two measuring electrodes, due to the current flowing inside the structure (or soil). Several arrangements of the electrodes are possible, depending on the investigation depth and the desires spatial resolution; a detailed survey of these arrangements is in [9, 10]. ERT has found large application, both in underground inspection, for landslide monitoring [11] and detection of buried targets. A typical application of ERT to infrastructure diagnostics is presented in [12]. In the recent years, efforts have been also focused on the development of non-invasive ERT sensors as in [13]. The possibility to use ERT as a fixed sensors array on the structure, able to monitor in a time continuous way the inner of structure, can be considered as an example of non-conventional “embedded sensor”.

Several examples of combined us of ERT and GPR are reported in literature for underground inspection [14] and the monitoring of the healthiness status of a dam [12]. The main reason of the success of the combined use of GPR and ERT is in the different degree of investigation depth and spatial resolution ensured by the two techniques; in fact, while GPR is able to ensure better resolution, ERT is capable to achieve larger depth investigation.

The other main methodology to investigate the inner part of the structure exploits seismic, sonic, and ultrasonic waves, which are characterized by different work frequencies. The seismic methods exploit waves with a frequency between 1 Hz and 100 Hz. Sonic or acoustic waves have a frequency ranging in the interval between 20 Hz and 20 KHz, whereas ultrasonic waves are characterized by frequencies larger than 20 KHz, with a work frequency interval between 100 KHz and 20 MHz [15]. Resolution and penetration depth depends on the working frequency , where the use of lower frequencies permits to improve the investigation depth but worsening spatial resolution [16].

The working principle is based on the transmission of the waves and the measurement of the travel time employed by the waves to propagate from the sources to the receivers; in this way, it is possible to estimate the distribution velocity in two-dimensional (2D) or three-dimensional (3D) cases. The spatial distribution velocity is related to the physical features of the investigated areas of the structure; by this way, it is possible to gain information about the geometrical and physical characteristics of the defects in terms thickness and location of the weathering layer, mechanical characteristics, status of cracking phenomena, fractures, and characterization of other anomalies. A detailed presentation of the technology is in [15] and examples of the application of the methods to engineering [17] and to the investigation of the shallower layers (depth of few centimetres) of historic buildings made of marble, sandstone and tuff [18]. A good example of the integration of GPR and sonic tomographic approaches is in

[19], where the combined use of the technologies permitted the evaluation of the size and density of fractures affecting the pillars as well as understanding that the pillars were affected by a crushing phenomenon.

Another class of technologies is specifically devoted to the investigation of shallower parts of the structure till to the surface.

Infrared thermography (IRT) is a remote sensing technique able to collect infrared radiation emitted by objects. The energy emitted by the surface is dependent on properties of the investigated structure such as: the spectral features as emissivity and reflectivity and the thermal properties as conductivity, specific heat, diffusivity; in their turn, these quantities depend on properties as water content, humidity content, porosity, and density. Detailed explanation of IRT and the thermo-optical properties of materials is reported in [20]. IRT surveys can be carried out in two ways, depending on the source that creates the heat transfer process; in passive methods, the source of the thermal wave is natural; in active methods, an artificial source is deployed for the generation of thermal waves impinging on the object under investigation. IRT has found several applications in civil engineering; examples are in [20] for defect detection and characterization on a civil engineering specimen in real field conditions and also on a realistic structure as Musmeci bridge (Potenza, Southern Italy) [5], where IR was deployed to monitor apparent temperature of the infrastructure by deploying low cost infrared cameras [5].

A methodology related to IR is the hyperspectral sensing exploiting bands in the visible-near infrared and short-wave infrared (NIR-SWIR) regions. This technology is capable to gain qualitative and quantitative information about many inorganic and organic compounds. Therefore, the hyperspectral sensing is able to detect new mineral phases, biological growth, the presence of black crusts, and changes in roughness on rock surfaces, as well as to monitor chemical and physical status of painted surfaces [21]. This technology can be used in remote sensing modality so to achieve surface maps and lithological discrimination as well as mineral mapping. Use of the hyperspectral technologies is relatively recent and the main advantage consists of the capability to acquire multi-spectral images (continuous spectral bands with the related bandwidth dictated by width of the single spectral channel in the spectrometer) for acquisition spectra in laboratory conditions and on-field [22].

3.2.2 Material characterization

Material properties of elements of existing structures, including historical ones, are generally analysed for both retrofit intervention and/or vulnerability analyses. Technical standards applicable to testing of materials or building elements extracted from existing structures usually define geometry, type of tests and number of replications. Many structures are considered valuable and protected under various rules and requirements defined by conservation policies. In such a case, the testing procedures provided by technical norms and standards are still applicable but the requirements regarding the specimen geometry and number of samples may not be acceptable. This may cause difficulties and methodology is needed that permits an estimate of design values of in-situ structural elements based on limited experimental data.

The combination of several non-destructive techniques is often used empirically, by combining observations by means of two techniques, with the main aim to improve the accuracy and reliability in the characterization of the compressive strength of concrete. The working principle tries to correlate the observed measurements and the searched for property. The standardized method widely used

internationally is Son Reb method. The best approach is based on the possibility to correlation the Ultra Sonic Pulse Velocity, the index of rebound hammer and the compressive strength of laboratory controlled specimens. This Non Destructive Testing method permits fast measurements, is simple to be used on-field and cost-effective; it has application for testing actual structure instead of representative cube sample and making measurements with a high flexibility in the choice of number of points and their locations.

3.3. Embedded sensors

One of the timely scientific challenges in SHM regards the development and use in operational conditions of the embedded sensors [23]. The concept of embedding can be read in two different ways: the first one regards the "physical embedding sensors in or at the surface of the structure; the second one can be stated as sensors (or sensors network) with capabilities to monitor continuously the structure and send out the data to a centre by means of a wireless transmission.

The possibility to embed the sensors directly in the structure during its construction allows for a clear vision of the structure at the "time zero" of its lifecycle, thus taking into account the entire life cycle of the structure (including its response to extreme events and the actual traffic load).

The first and most assessed class of embedded sensors includes the optic fiber sensors (FOS) and optical systems for a pointwise or distributed monitoring of several physical and chemical quantities related to the healthiness of the structure. Different classification of fiber optic sensors are given in [23]; here, we adopt the one, where FOS are classified on the capability to make local measurements (such as Fabry-Perot FOS or long gauge FOS, etc.), quasi-distributed (fiber Bragg grating) and distributed sensing (Brillouin-scattering-based distributed sensors) [24].

FOS are installed on the surface of the already existing structures, or embedded in structures of new construction, (buildings, dams, bridges) to achieve information about static and dynamic strain, temperature, defects such as cracks, fractures, corrosion and delamination phenomena, chloride ionic concentration. The sensed data are exploited to evaluate the healthiness of new-built and repaired structures, and spatially monitor the degree of damage. Good literature survey of FOS is reported in [25, 26], where the use of FOS in real operations, especially for monitoring bridges is presented. Here, we point out the use of the new concept of distributed sensing by FOS exploiting the Brillouin scattering. This technique has been validated largely in laboratory conditions [27] and after applied on bridges for the monitoring of strain [28].

Another class of embedded sensors are based on piezoelectric (PZT) ceramics, piezoelectric polymers, and piezoelectric composites. Piezoelectric sensors are gaining increasing interest in the frame SHM of civil engineering structures; PZT exploit the measurement of electrical impedance and elastic waves. In particular, this active sensing technology is based on the deployment of the PZT sensor, which is installed directly on the structure and after excited by an alternating electric field; this electric field generates a small deformation in the PZT wafer and the structure where PZT is installed. This induced mechanical oscillation generates a response of the attached structure at local level, which is after transferred to the PZT sensor and encoded under form of a variation of the electrical impedance. When a crack or damage arises in the area where the PZT sensor is installed, this phenomenon enables a change of the electrical impedance response of the PZT wafer [29]. This means that degradation and aging of the structures are indirectly measured as variation of the PZT electrical impedance. The PZT based sensing method is local

and allows just a qualitative estimation of the causes of the damage/degradation; in fact, different phenomena such as cracks, corrosion and delamination can affect the mechanical impedance in a similar way, so that it is not possible discriminate among different damage causes. Therefore, the impedance-based technique is able to detect damaged area, where other quantitative techniques are deployed to gain more quantitative information about the nature of the damage. Despite of the above mentioned drawbacks, PZT sensors are now used in SHM for the simplicity of use also by a non-expert operator; an example is in Soh et al. [30], where the impedance-based method has been carried out by deploying 11 PZT sensors for monitoring cracking phenomenon affecting a prototype reinforced concrete bridge.

Ferromagnetic materials exhibit the interesting property that when they undergo to the magnetic field, they are affected by a mechanic deformation (magnetostrictive effect). The inverse magnetostrictive effect exploits the phenomenon of detection of a change of the magnetic induction when the material undergoes to a mechanic deformation. Kwun and Bartels were the first to realize a magnetostrictive sensor (MsS) based on the following working principle [31]. The sensor exploited a coil and a magnet (transmitting coil) in order to generate the magnetic field; the magnetic field induces an elastic wave propagating in the material (magnetostrictive effect); a receiving coil (and magnet) detects a change in the magnetic induction of the material due to the propagating elastic wave (inverse magnetostrictive effect). The guided waves have the main advantage to ensure long-distance monitoring dispatches, but this sensor is suitable just for the inspection of ferromagnetic materials. Really, just low ultrasonic energy can be propagated (low signal to noise ratio) and the induced energy depends crucially on the distance between the probing sensor and the material under investigation. An application in civil engineering was carried out at George Washington Bridge in New York [32]; a guided pulse was propagated (10 KHz) along the suspender of the bridge and the receiver was able to detect the signal reflected by the different constructive elements and defects along the suspender.

3.4 Vibrational Analyses (dynamic behaviour of the structure)

Vibration based damage identification techniques are now largely applied in order to assess the health state of the buildings [33-35]. In literature, methodologies for SHM have been developed, based on the evaluation of the change of the dynamic behaviour of the structure, in terms of modal parameter (frequencies, mode shapes, damping) and/or of non-modal parameters as the operational deflection shapes (ODS). Many methods carry out the damage identification by comparing the undamaged state (or initial reference status) with the damaged state. In general, structural and non-structural damage can be defined as a local and/or global stiffness reduction of the elements constituting a system. Therefore, damage is related to variation of the material and/or geometric properties, affecting the current or future performance of these systems. The experimental validation of these procedures has also highlighted the limitations in terms of damage localization, and most importantly, quantification of damages, as well as the inconvenience of sensitivity with respect to the quality of measurements and the influence of environmental factors and operational values estimated by dynamic properties [36].

In the last two decades, different methodologies [37-42] have been proposed to identify the dynamic behaviour of real structures [43-47]. These methodologies allow you to get through experimental measurements the parameters of a mathematical model of a monitored system.

For existing structures, the inverse approach is generally used to characterize the dynamic properties of a structure, by idealizing it as a black-box, where the relevant parameters are evaluated directly analysing

input and system response. In order to implement a damage identification process, several steps are required including the observation of the analysed system over time, the extraction of damage-sensitive features and the statistical analysis of these features. The output of this procedure is the periodically updated information regarding the state of healthiness of the system and its capability to perform the service functionalities.

Structural health monitoring is useful to provide, in near real-time, these information during an extreme event, such as an earthquake. Particularly, it is possible to monitor the state of health of a system by using vibrational data collected from permanent or temporary network of sensors installed on the monitored structure.

In recent years, significant research activity has regarded the development of methodologies for Non-destructive Damage Evaluation, based on the variation of the structural dynamic parameters [48, 49]. Generally, vibrational based inspection methods for Damage Evaluation are classified according to four levels [50]:

- I level: these methods are able to detect damage on a monitored structure;
- II level: these methods are able to detect and localize a damage occurred on a monitored structure;
- III level: these methods are able to detect, localize and quantify (in terms of severity) a possible damage occurred on a monitored structure;
- IV level methods: these methods are able to provide all the information related to III level methods by even performing analyses related to the socio-economic impact of the damage occurred on the monitored structure.

Recently, several authors [47, 49, 51] highlighted the possibility to use the geometric characteristics of the structural mode shapes in order to detect, localize and quantify structural and non-structural damage on monitored structures. One of these methods [47] is used to localize structural damage after a relevant earthquake and exploits the Stockwell Transform, which is a useful mathematical tool for nonlinear signal analyses. Recorded signals are analysed by means of the Band-Variable Filter [47] and the method is based on the use of one tri-directional accelerometric station for each significant degree of freedom of the monitored structure: these stations, positioned along the structures, are able to provide information about the fundamental mode shape and its variations over time.

4. CONCLUSIONS

The Structural Health Monitoring must take into account many different issues that regard not only the state of the infrastructure but also the hazards that characterize the site where the infrastructure is located and the interaction between site and infrastructure. In many cases, these issues are coupled and/or can arise cascading effects. Moreover, when the infrastructure is located in a site characterized by natural hazard the monitoring system has to cover the whole risk cycle.

Up to now, SHM has been generally based on technologies typical of structural engineering (as accelerometer, velocimeter, sclerometers, material characterization, etc.).

In last years the approach itself of SHM has changed deeply for many convergent reasons, such as: the capability of combining traditional structural technologies of monitoring with other ones coming from other scientific and technological fields; the impact on monitoring of positioning technologies and ICT; the

new ways in which people stay together (as social networks) developed new technologies, which also if are not directly driven by monitoring issues have a deep impact on them.
Moreover, the fact that a large part of population is continuously connected in ubiquitous networks (as social networks) changes substantially the system of communication of information, since all people connected contemporarily receive and diffuse information and allows that devices not designed to be sensors (as smartphones) can be used as sensors.

Accordingly, new frontiers in SHM opening even if services still underexploit the new capabilities developed in last years, we briefly summarize:

1. *The revolution in satellite sensing*

a. VHR resolution mini-satellite constellations in optical band
b. SAR Very High Resolution constellation as Cosmo-SKYMed and TerraSAR
c. The program Copernicus (that is a flagship Program of UE) whose Data Policy is based on Free and Open Access to Data
d. The program Galileo (that is a flagship Program of UE) that allows at obtaining metric positioning, strongly improving the traceability, with a strong impact on monitoring capabilities of new observational platforms as unmanned vehicles

2. *The development of a new generation of low cost sensors (and no cost sensors) and their networking as in the case of sensors no sensors, miniaturized sensors, citizens as sensors*

3. *The development of embedded sensors and the use of traditional sensors as embedded sensors as FOS, PZT, MsS*

4. *The improvement of traditional EO technologies as GPR, ERT, US, IRT, hyperspectral sensing, vibrational inspection methods*

5. *ICT federate and scalable architectures, wireless networks, web sensors and web services, HPC, IoT, data interoperability, cloud, big data.*

6. *The integration of all these technologies into an holistic approach.*

It must be remarked the added value due to integration of EO technologies (both satellite based, airborne and ground based) with navigation technologies and ICT. In practice, a toolbox has been developed whose pieces can be combined in the most appropriate ways to cover all aspects of the SHM. In this way, it is possible to define a monitoring strategy based on a layered approach in which the various layers are activated, from the cheapest to the most expensive depending on the criticality of the infrastructure.

At last, it must be remarked that monitoring data can be assimilated into structural modelling, so that it is possible to have an early warning of criticalities. This means not only that it is possible to define a strategy of ordinary and extra-ordinary maintenance that optimizes interventions increasing the average life of the infrastructure and reducing its costs calculated over its whole life but also the is possible to prioritize interventions to be done.

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SURVEY ON UNSOLICITED DONATIONS

Research project on challenges of unsolicited donations

We know that surges in non-priority donations in response to a crisis can impede rapid flows of critical supplies to affected populations because they can overload and block supply systems. What we don't know is how we can plan to deal with this material convergence in different disaster scenarios and whether we need different approaches contingent on the circumstances.

Prof. Paolo Trucco, Prof. Christine Harland and Dr. Yasmine Sabri of the School of Management, Politecnico di Milano (Italy), a leading international business school, propose to conduct a survey of experts in the TIEMS network to provide practical guidance to further understanding of this complex problem. They have researched existing knowledge and propose to investigate whether mobilisation and coordination of supply chain resources may need to be planned and executed in different ways to suit different disaster profiles. As academic experts in crisis management, inter-organisation network strategy and supply chain management, they view this initial research as a way to provide rapid information to TIEMS that could be used further to investigate more in-depth issues arising from the findings.

We kindly ask that TIEMS members respond to the survey by **20th August 2018** using this link to the survey https://www.surveymonkey.com/r/MatrialConvergence

In return for this rapid response, we will provide back to the TIEMS network a report of practical findings by the end of October 2019. We will also present and discuss findings at an appropriate TIEMS event.

We greatly appreciate your support in this research and look forward to greater collaboration with your influential network.

Paolo, Christine and Yasmine

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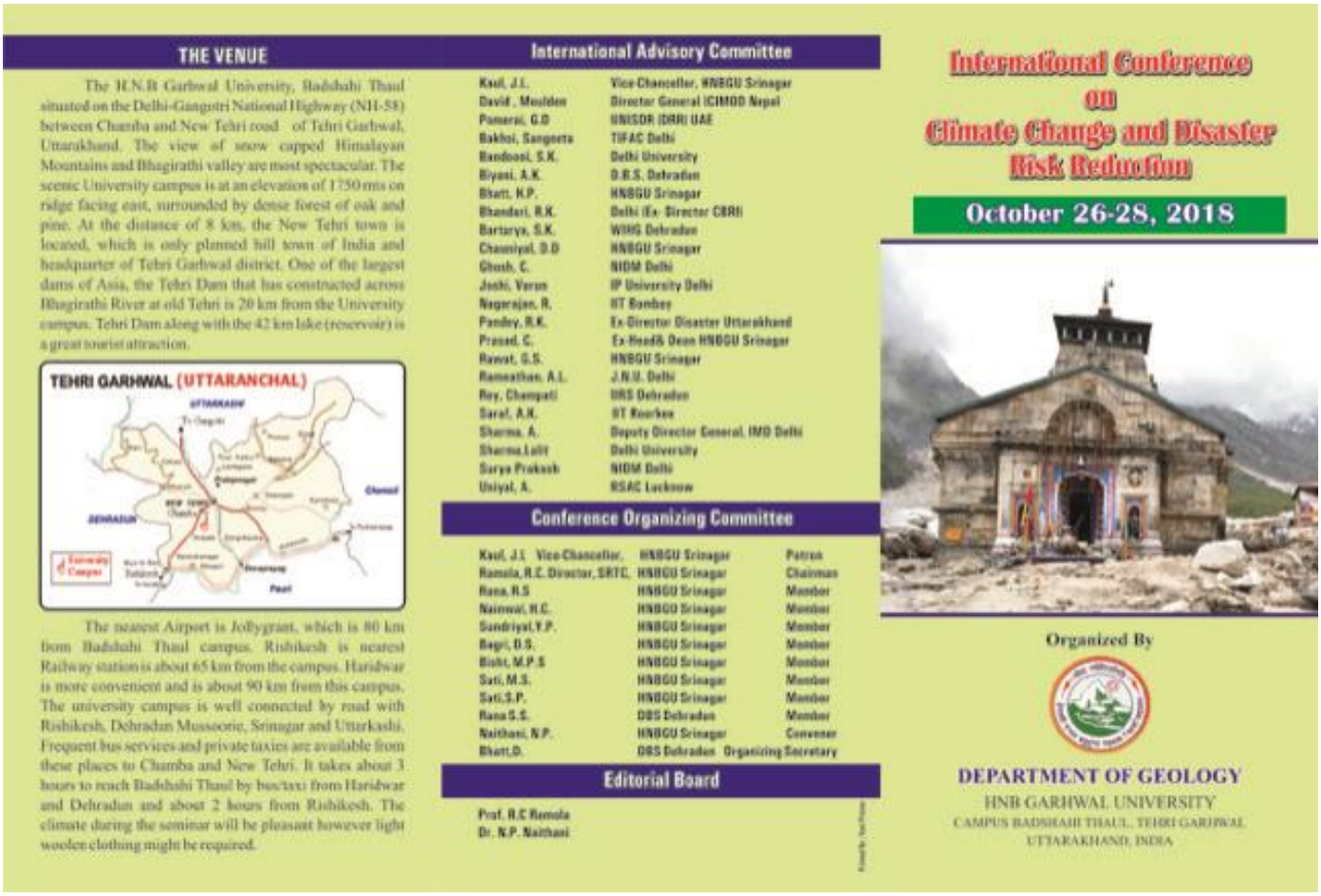
INTERNATIONAL CONFERENCE ON CLIMATE CHANGE AND DISASTER REDUCTION IN INDIA



THE VENUE

The H.N.B Garhwal University, Badshahi Thaul situated on the Delhi-Gangotri National Highway (NH-58) between Chamba and New Tehri road of Tehri Garhwal, Uttarakhand. The view of snow capped Himalayan Mountains and Bhagirathi valley are most spectacular. The scenic University campus is at an elevation of 1750 mts on ridge facing east, surrounded by dense forest of oak and pine. At the distance of 8 km, the New Tehri town is located, which is only planned hill town of India and headquarter of Tehri Garhwal district. One of the largest dams of Asia, the Tehri Dam that has constructed across Bhagirathi River at old Tehri is 20 km from the University campus. Tehri Dam along with the 42 km lake (reservoir) is a great tourist attraction.

The nearest Airport is Jollygrant, which is 80 km from Badshahi Thaul campus. Rishikesh is nearest Railway station is about 65 km from the campus. Haridwar is more convenient and is about 90 km from this campus. The university campus is well connected by road with Rishikesh, Dehradun Mussoorie, Srinagar and Uttarkashi. Frequent bus services and private taxies are available from these places to Chamba and New Tehri. It takes about 3 hours to reach Badshahi Thaul by bus/taxi from Harishwar and Dehradun and about 2 hours from Rishikesh. The climate during the seminar will be pleasant however light woolen clothing might be required.

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International Conference on Climate Change and Disaster Risk Reduction

October 26-28, 2018

Organized By

DEPARTMENT OF GEOLOGY
HNB GARHWAL UNIVERSITY
CAMPUS BADSHAHI THAUL, TEHRI GARHWAL
UTTARAKHAND, INDIA

INTRODUCTION

CLIMATE CHANGE AND DISASTER influences the Natural resources, Bio-diversity, Monsoon, Earth processes, Socio-economic activities and development of the country. World ecology is very fragile and vulnerable to the disaster. Climate change is a change in the statistical distribution of weather pattern or variation in weather for long time. Nowadays climatic change refers specially to global warming and greenhouses gas effects. Climate change impact on rising sea level, melting ice, changing Eco-system, storms, typhoons, flood, ocean acidification etc. The higher frequencies of events such as cloudburst, landslides, flood, cyclones, Tsunami and earthquakes are considered as a signal of climatic change. Himalaya ecosystem such as snowy peaks, green flora, fauna, a vast reservoir of freshwater in the form of perennial rivers are under stress and posing a serious threat to mankind as these are depleting at an alarming rate. Disaster Risk Reduction (DRR) is the concept and practice of reducing disaster through systematic effort to analyze and reduce the causal factor of disaster. Wise management of land and environment, preparedness and early warning system for adverse condition can reduce human loss and property. D.R.R main aim to reduce damage caused by Natural disaster (earthquake, Tsunami, flood, cyclones and droughts.) and manmade disaster (construction of dam, bridge, Tunnel, road, buildings, deforestation and forest fire). India has been traditionally vulnerable to natural disasters because of its unique geo-climate. The 5th Global Platform for Disaster Risk Reduction specifically recommends integrated policies to achieve the SDGs (Sustainable Development Goals), the Paris Agreement commitments and the Sendai Framework targets. 26th October 2004 Tsunami in Sumtra Islands, Nepal earthquake on 25th April 2015, Haiti earthquake 2010, Maxico earthquake of 2017, Floods in China in 1998 and 2016, Cyclones in America, Hurricane Harvey and Hurricane Irma causes loss of life and property. Similarly, in India, Latur earthquake in 1993, Bhuj earthquake in 2001, Kasmir earthquake in 2005 and cyclone in Orissa 1999 have also caused heavy loss of life and property. In context of Uttarakhand, 1991 earthquake of Uttarkashi, 1999 Chamoli earthquake and Kedarnath tragedy of 2013 causes loss of life and property in Uttarakhand. For this purpose we introduced the forum and open conference, interactive discussion on climate change and disaster risk reduction and hope when we walkout from here we will have certain methodology, techniques and preparedness of disaster.

THEMES OF THE CONFERENCE

- Climate change and observation on present climate
- Impact of climate change
- Climate monitoring and Early warning system
- Modelling of climate change
- Urban and Rural planning for Disaster risk reduction
- Natural and Anthropogenic Disaster.
- Disaster Risk reduction modeling
- Role of Higher education, NGO and Institutions in Disaster risk reduction
- Socio-Economic impact of Disaster
- Impact of Natural/Man-Made Radiations on human population

Submission of abstract and paper

Theme based research papers are invited for oral and poster presentations. The abstract is limited to 300 words should be typed with 1.5 line spacing on A4 size paper, with 12 font in times new roman giving 2.5 cm margins on all side. The abstract may be email to the 'Convener, CCDRR-2018: npnaithani97@gmail.com; and srt.ccdrr2018@gmail.com

Calendar of events

Submission of abstract	30 April 2018
Acceptance of Abstract	31 May 2018
Submission of paper and registration	31 July 2018

Correspondence

Dr. N.P. Naithani
Convener,
Department of Geology, HNB Garhwal University
Badshahi Thaul Campus, Tehri Garhwal - 249199
Telephone 01376- 254136, mobile 09758045987
Email.; npnaithani97@gmail.co & srt.ccdrr2018@gmail.com

Registration Fee

Faculty member	Rs.2500/
Research Scholar	Rs 1000/
Accompanying person	Rs 800/

Registration fee is to be paid by bank draft in the favour of Convener ,CCDRR, HNBGU Campus Badshahithaul Tehri, Payable at New Tehri.

Financial Assistance and Accommodation

IInd class or IIIrd AC Train fare and accommodation will be provided only to Keynote and Invited speakers. TA may be provided to limited number of research students depending on the availability of the funds. For accommodation, the participants may contact directly to Hotel, Tehri Himalaya Residency, Baurari New Tehri, Uttarakhand
Email: hotelthr80@gmail.com;
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Registration Form

International Conference
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October 26-28, 2018

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ONTARIO DISASTER & EMERGENCY MANAGEMENT CONFERENCE IN TORONTO

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DISASTER AND EMERGENCY MANAGEMENT CONFERENCE

OCTOBER 3-4, 2018
THE INTERNATIONAL CENTRE
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Macgregor Communications (MC), a market leader in business events and online learning, is pleased to announce a partnership with the Ontario Association of Emergency Managers (OAEM), to produce a new conference that will serve the needs of Canadian emergency management professionals, to be delivered in Toronto, Canada, on October 3-4, 2018.

The World Conference on Disaster Management (WCDM), one of MC's long-standing franchises, has been a leading conference for the disaster management community, providing a unique combination of emergency management and business continuity education. "The new emergency management conference will be more directly relevant to Ontario's CEMC's, plus emergency management professionals from the Red Cross, Public Safety and Social Services amongst others" said Mike O'Brien, OAEM President. "Experienced practitioners will help attendees promote safer communities, and cope with the many hazards that occur when disaster strikes". "This is another natural shift for WCDM to better prepare and mitigate the vulnerabilities our local communities face with all too common disasters," said Dan Joyce, VP Business Development, MC, "the Program will be packed with renowned keynotes, three concurrent streams of education and include workshops, a disaster management exercise plus webinars." More details on the Ontario Disaster & Emergency Management Conference is available at the conference web site www.WCDM.org


PUBLIC
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MANAGEMENT

1ST INTERNATIONAL DISASTER MANAGEMENT CONFERENCE (IDMC 2018) IN TURKEY

"Refugee, Migration, Security and Cooperation"

Since the large scale earthquake which happened in Japan, 2011, and caused, through the tsunami it triggered, the death of a great many people, billions of dollars of financial damage and a radioactive leak whose detrimental effect may last for years, the question "what can we do in order to minimise the disaster-induced loss" has been asked more frequently. The global answer seekings for such questions eventually introduced a study of a suggestion packet prepared for the years 2015-2030 to reduce disaster risks. According to this suggestion packet, called as Sendai Framework, the countries have come to terms with applying all current scientific items of integrated disaster management system to minimise disaster risks and reduce the disaster-induced loss within the specified period. Our country, too, under this agreement framework, makes effort to be able to remove the sensibilities it has against disasters or to reduce them to a reasonable level. Yet, the political, demographical and strategical characteristics of the geography we live in, continue adding, along with natural disasters, the risks caused by a great many different problems as well. The most important of these are the migration of three million Syrian refugees to our country due to the latest developments in the Middle East, and the threats imposed on civilians by terrorist organisations which have received the supports of the sovereign powers with the aim of having control over this vulnerable geography. From this point of view, in our country which has high experience about natural disasters, particularly about earthquake and landslide, taking its immigration experience into consideration as well, we have decided to organise an International Disaster Management Congress by which we wish to discuss the subject of disaster management in utter detail and to assess the related studies carried out all around the world. We are honoured and pleased to invite all academicians and scientists who want to share their studies on disaster management to the congress to be carried out at Gumushane University, Gumushane, Turkey on 22-24 October 2018 with the cooperation of Gumushane and Girne American Universities.

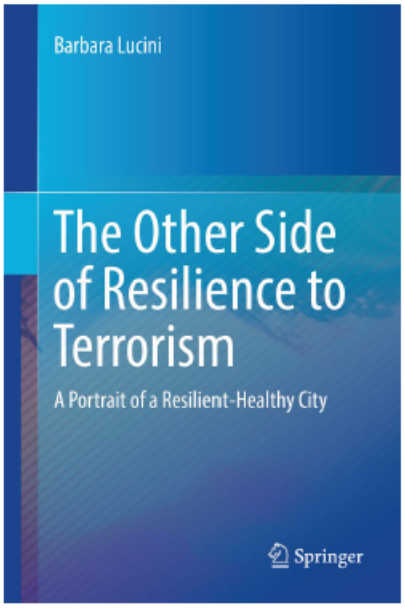
Web site: http://idmc2018.gumushane.edu.tr/en/

Conference Topics

- Planning and Mitigation for Emergencies and Disasters
- Mapping of Disaster Areas
- Modelling Studies for Disaster and Emergencies
- Crisis Management in Case of Disaster and Emergencies
- Hazard Management in Terms of Disaster and Emergencies
- Risk Management in Terms of Disaster and Emergencies
- Health Care Services Management in Terms of Disaster and Emergencies
- Disaster and Emergency Recovery and Local Response
- Search-and-Rescue Techniques and Technologies
- Science and Technology for Disaster Management and Emergency Assistance
- Post-Disaster Reconstruction Strategies
- Urban Transformation
- National and International Approaches and Applications in Disaster Management
- Formation of Disaster-Resistant Environment, Resilience of Built Environment
- Forecasting and Early Warning Systems for Catastrophes
- Roles and Responsibilities of Stakeholders in Disaster Management
- Fire Safety
- National and International CBRN (Chemical, Biological, Radiological and Nuclear) Implementations
- Immigration and Refugee
- Risk Transfer, Insurance and Governance
- National and International Collaboration
- Disaster Management Training
- Resistance and Sustainability of Energy, Agriculture and Livelihoods
- Media and Disasters
- Communication / Communication Infrastructure of Communities in Disaster and Emergency Situations
- Disaster and Emergency Logistics and Logistics Applications
- Disasters, Emergencies and Law
- Disasters, Emergencies and Environment
- Strategy Development for Disaster and Emergencies and R&D (Research and Development)
- Disaster and Emergency Health Services Organization
- Health Disaster Plans
- Medical Rescue Teams
- Disaster Medicine
- Pre-Hospital Emergency Health Services in Disasters
- Pre-Hospital Case Management
- Human Resources Management in Disasters
- Laws, Regulations and Standards
- Disaster and Emergency Education
- Civil Defense Services
- Emergency Health Services in Disasters
- Public Health Applications in Disasters
- Healthcare Management in Disaster and Emergencies
- Disaster Epidemiology
- Criminology in Disaster and Emergencies (Identification et. Cetera)
- Debris Management and Demolition Zones
- Volunteering in Disaster and Emergencies

- Central and Local Government in Disaster and Emergency Situations
- Strategic Management in Disasters
- Disaster Risk Reduction and Training
- Disasters, Emergencies and Geographical Information System
- Disasters and Climate Change
- Data Security in Disasters and Emergencies
- Buildings in Disaster and Emergencies
- Disaster Management and Wars
- Security in Mines
- Security in Vehicles and Transportation Routes
- Food Safety in Disaster and Emergencies
- Waste Management in Disasters and Emergencies
- Vulnerable Groups in Disaster and Emergencies
- Civil Society Organizations in Disaster and Emergencies
- Multidisciplinary Approach in Disaster and Emergencies
- Occupational Safety and Health

THE OTHER SIDE OF RESILIENCE TO TERRORISM (BOOK)



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Barbara Lucini

The Other Side of Resilience to Terrorism

A Portrait of a Resilient-Healthy City

- Using an ethnographic approach, this book shows the importance of social perceptions, the role of culture -- whether it be ethnical or organizational, and the professional interpretations of urban and social vulnerabilities, public resilience, and safety and security from various points of view
- Takes readers on a journey through the traces and signs of the other side of resilience, showing the importance of change and considering resilience as a social competence that can influence communicative and operative practices in cases of crisis or disaster
- Presents two compelling theoretical and methodological models to enhance public resilience related to public health and its assessment of t

This timely treatise introduces an innovative prevention/preparedness model for cities to address and counter terrorist threats and events. It offers theoretical background, mixed-method research, and tools for creating a resilience-based response to terrorism, as opposed to the security-based frameworks commonly in use worldwide. The extended example of Milan as a "resilient-healthy" city pinpoints sociological, political, and economic factors that contribute to terror risk, and outlines how law enforcement and emergency management professionals can adopt more proactive measures. From these observations and findings, the author also makes recommendations for the professional training and city planning sectors to address preparedness issues, and for community inclusion programs to deter criminal activities in at-risk youth. Features of the coverage: Summary of sociological theories of terrorism The Resilience D model for assessing and managing urban terrorist activity Findings on resilience and vulnerabilities of terror groups Photo-illustrated analysis of neighborhoods in Milan, describing areas of risk and resilience Virtual ethnography with perspectives from native residents, recent immigrants, and security experts Proposals for coordinated communications between resource agencies The Other Side of Resilience to Terrorismwill hold considerable interest for students, stakeholders, practitioners, and researchers.

Next TIEMS Newsletter

The next TIEMS Newsletter is planned for October 2018

TIEMS issues its electronic newsletter quarterly, and it is distributed to more than 160 000 experts worldwide, with articles on global emergency and disaster management events and activities, TIEMS news, etc.

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Issue no. 33 is planned for June and contributions are welcome. Please, contact one of the editors or TIEMS Secretariat if you have news, an article of interest or like to list coming events of interest for the global emergency and disaster community or like to advertise in this issue.