

# MEMSCON

Radical developments in telecommunications and sensor technologies are about to change the way that civil engineering design and infrastructure maintenance are conceived and carried out. Indeed, within the next ten years smart structural elements with embedded sensors and systems capable of self-diagnosis will be a normal part of civil infrastructure.

These elements will be permanently connected to a distributed management network so that owners, users, and in general, all those involved in the production/management process - connected via the Internet - can check element conditions during production, transport, installation and operation.

Of special importance is the monitoring of civil infrastructure during an earthquake. During such an event structures may exceed their functional or structural limits and this can be visible. On the other hand, they can also suffer enormous damage to their capacity without producing any apparent visible signs. Such damage can result in life threatening conditions evolving in the structure long after the earthquake has happened. Monitoring systems can provide a quick and accurate estimate of the level of seismic damage that can be used to indicate loss of function and a quick and reliable assessment of the capacity of the structure to survive expected aftershocks.

The goal of this workshop is to provide a state-of-the-art report on recent research activities, technological utilisation and commercialisation activities in structural monitoring systems and software for the status-dependent maintenance and repair of constructed facilities.

This event, which is organized by the partners in the EC funded project MEMSCON, will bring together the Structural Health Monitoring community, European construction companies, owners of constructed facilities, insurance companies, policy makers and sector experts.



## VENUE

**Athenian Capitol Mall, Ioulianou and Triti Septemvriou Corner, Athens, Greece**

Athens, is the capital and largest city of Greece. Athens dominates the Attica periphery and it is one of the world's oldest cities, as its recorded history spans around 3,400 years. The heritage of the classical era is still evident in the city, represented by a number of ancient monuments and works of art, the most famous of all being the Parthenon, widely considered a key landmark of early Western civilization. The city also retains a vast variety of Roman and Byzantine monuments, as well as a smaller number of remaining Ottoman monuments projecting the city's long history across the centuries.

The workshop will be held at the Conference Center of the Athenian Capitol Mall of the Charagionis Foundation in the city of Athens, Greece. The Athenian Capitol Mall also contains a 3D cinema, some 30 shops, and 10 restaurants and cafes and Greece's first Motor Museum. This museum, part of the Foundation, hosts 110 antique and top-of-the-line vehicles, with the oldest on display being a 1895 Hungarian - made fire engine and the newest a 1980 Ferrari 308 GTS.

### Suggested Accommodation:

#### Radisson Blu Park Hotel

10, Alexandras Av.  
10682 Athens, Greece  
Tel: 0030 210 88.94.500  
Fax: 0030 210 82.38.420  
[www.rbathenspark.com](http://www.rbathenspark.com)

#### Titania Hotel

52, Panepistimiou Str,  
10678 Athens, Greece  
Tel: 0030 210 33.26.000  
Fax: 0030 210 33.00.700  
[www.titania.gr](http://www.titania.gr)

[www.memscón.com](http://www.memscón.com)



**Towards Intelligent  
Civil Infrastructure**

**March 29, 2012**

**Athenian Capitol Mall, Athens, Greece**



[www.memscón.com](http://www.memscón.com)





## WORKSHOP AGENDA

### Opening Session

- 09:00-09:05 **Welcome Address**  
Angelos Amditis (Institute of Communication and Computer Systems, Greece)
- 09:05-09:15 **Structural Monitoring for Post-Earthquake Decision Support on School Safety**  
Panagiotis Kerschoulas (President, Organization for School Buildings, Greece)
- 09:15-09:30 **MEMSCON Project: Presentation of the Concept, Objectives and Potential Impact**  
Angelos Amditis (MEMSCON Project Coordinator)

### Session 1: Advanced Sensing Technologies for Civil Engineering Structures

Chair: Daniele Zonta (University of Trento, Italy)

- 09:30-10:00 **Keynote Speech: Partitioned Computing of a Markov Parameter System Identification Method in a Heterogeneous Wireless Sensor Network Comprised of iMotes and Narada**  
Jerome Lynch (University of Michigan, US)
- 10:00-10:30 **Keynote Speech: Innovative monitoring technologies for underground infrastructure**  
Kenichi Soga (University of Cambridge, UK)

### Coffee Break (30')

### Session 1A: Advanced Sensing Technologies for Civil Engineering Structures

Chair: Jerome Lynch (University of Michigan, US)

- 11:00-11:20 **Mobile Acoustic Sensing for the Subsurface Profile of Pavement**  
Ming Wang (Northeastern University, US)
- 11:20-11:40 **Acoustic Sensors for Structural Monitoring in Construction**  
Athanasios Anastasopoulos (ENVIROCOUSTICS- member of MISTRAS group, Greece)
- 11:40-12:00 **Low Power Wireless Sensor Network for Structural Health Monitoring of Buildings using MEMS Strain Sensors and Accelerometers**  
Tom Torfs (IMEC, Belgium)
- 12:00-12:20 **Ultra Low Power Wireless Sensing for Long-Term Structural Monitoring of Civil Engineering Structures**  
Juan Santana (IMEC-NL)

### Session 1B: Advanced Sensing Technologies for Civil Engineering Structures

Chair: Kenichi Soga (University of Cambridge, UK)

- 11:00-11:20 **MEMS Accelerometers for Building Structural Health Monitoring Systems**  
Nicolas Bertsch (MEMSCAP SA, France)
- 11:20-11:40 **MEMS-Based Strain Sensors for Structural Monitoring of Civil Engineering Structures**  
Vincent Spiering (Thermo Fisher Scientific Inc., NL)
- 11:40-12:00 **Controlling structural vibrations via smart variable dampers: experimental investigations and possible applications**  
Antonio Occhiuzzi (University of Naples 'Parthenope', Italy)
- 12:00-12:20 **Distributed Fiber Optic Sensors for Structural Health Monitoring**  
Daniele Inaudi (Smartec S.A., Switzerland)

### Lunch Break (1h)

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Radio Frequency Identification Tags Linked to on Board Micro-Electro-Mechanical Systems in a Wireless, Remote and Intelligent Monitoring and Assessment System for the Maintenance of Constructed Facilities

### Session 2: Monitoring-Based Assessment of Structural Condition and Maintenance/Repair Management in Construction

Chair: Nicolas Bertsch (Memscap SA, France)

- 13:20-13:50 **Keynote Speech: Simple but effective SHM: The sceptic-practitioner view of what works well, what doesn't and where we should direct our efforts**  
James Brownjohn (University of Sheffield, UK)
- 13:50-14:20 **Keynote Speech: Non-Stationary Random Vibration Identification and Its Use in SHM**  
Spiliotis Fassois (University of Patras, Greece)

### Session 2A

Chair: James Brownjohn (University of Sheffield, UK)

- 14:20-14:40 **Expert system for proactive maintenance and rehabilitation following seismic damage**  
Stefanos Camarinopoulos (RISA, Germany)
- 14:40-15:00 **Monitoring-Based Structural Assessment of Reinforced Concrete Tunnels and Buildings under Operating and Seismic Loads**  
Dimitris Bairaktaris (DBA Ltd, Greece)
- 15:00-15:20 **Condition-Based Maintenance Management**  
Vassilis Kallidromitis (TECNIC, S.p.A., Italy)
- 15:20-15:40 **Development of practical health monitoring system for short and medium span bridges based on vibration responses of city bus**  
Ayaho Miyamoto (Yamaguchi University, Japan)

### Session 2B

Chair: Spiliotis Fassois (University of Patras, Greece)

- 14:20-14:40 **Practical application of SHM system based on optical FBG sensors for truss structures**  
Wieslaw Ostachowicz (Polish Academy of Sciences, Poland)
- 14:40-15:00 **Energy harvesting and vibration damping on wind turbines**  
Konstantinos Gkoumas (University of Rome 'La Sapienza', Italy)
- 15:00-15:20 **Development of an integrated monitoring system for building (energy) management and structural health monitoring**  
Young Lu (University of Edinburgh, UK)
- 15:20-15:40 **Highly Synchronous Wireless Sensor Network for Structural Health Monitoring**  
Martin Fritz (VCE Holding GmbH, Austria)

### Coffee Break (30')

### Session 3: Field Applications: Structural Monitoring and Assessment of Buildings and Bridges

Chair: Daniele Inaudi (Smartec SA, Switzerland)

- 16:10-16:40 **Keynote Speech: Wireless monitoring of historic structures using sensor networks**  
Christian Grosse (TU Munich, Germany)
- 16:40-17:10 **Keynote Speech: Monitoring Civil Structures using Fiber Optic Sensors**  
Branko Glisic (Princeton University, US)

### Session 3A

Chair: Christian Grosse (Technical University Munich, Germany)

- 17:10-17:30 **Early Warning Monitoring System of Modular Expansion Joints Based on Dynamic Behavior**  
Willy Peelen (TNO, The Netherlands)
- 17:30-17:50 **The monitoring system of the "Due Torri" in Bologna, Italy: preliminary results**  
Giada Gasparini (University of Bologna, Italy)
- 17:50-18:10 **Structural integrity monitoring of a cable-stayed bridge with artificial neural networks**  
Stefania Arangio (University of Rome 'La Sapienza', Italy)

### Session 3B

Chair: Branko Glisic (Princeton University, US)

- 17:10-17:30 **Earthquake assessment of reinforced concrete buildings**  
Daniele Zonta (University of Trento, Italy)
- 17:30-17:50 **Structural Health Monitoring of the Large Adriatic Arch Bridges**  
Jure Radic (University of Zagreb, Croatia)
- 17:50-18:10 **Seismic isolation and monitoring of a religious building in Italy**  
Mariacristina Spizzuoco (University of Naples 'Federico II', Italy)

- 18:10-18:25 **Concluding remarks**  
Angelos Amditis (Institute of Communication and Computer Systems, Greece)

## Towards Intelligent Civil Infrastructure

March 29, 2012, Athens, Greece  
**ATHENIAN CAPITOL**

## REGISTRATION FORM

Please provide the following information to Despoina Kaneti by fax or email by 10 March 2012:

Phone Number: **+30 210 7721663**  
Fax Number: **+30 210 7722291**  
Email: **workshop@memscon.com**

The registration to the conference is free of charge. Organizational costs are covered by the **MEMSCON** project

## CONTACT INFORMATION

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www.memscon.com