



# SMART2015

**7<sup>th</sup> ECCOMAS Thematic Conference  
on Smart Structures and Materials**

## **Book of Abstracts**

**PROGRAMME INCLUDED**

**3-6 June, 2015**

**University of the Azores • Ponta Delgada**

Azores • Portugal

Title: Book of Abstracts **SMART2015**  
7<sup>th</sup> ECCOMAS Thematic Conference  
on Smart Structures and Materials

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## Welcome

On behalf of the European Community on Computational Methods in Applied Sciences (ECCOMAS) we are pleased to welcome you to the Azores for the 7<sup>th</sup> ECCOMAS Thematic Conference on Smart Structures and Materials (SMART2015), held at the University of the Azores, Ponta Delgada Campus, S. Miguel Island. Previous editions have been the very successful conferences in Poland (Jadwisin and Gdansk), Portugal (Lisboa and Porto), Germany (Saarbrücken) and Italy (Torino).

The aim of this ECCOMAS series of conferences has been to gather the smart technologies community, providing a forum for the discussion of the current state of the art in the field and generating inspiration for future ideas on a multidisciplinary level. Smart structures and materials encompass sensing, actuation and control capabilities to be combined from a systems approach, on a macro, meso or even micro scale, and have triggered a variety of new research areas with impacts in the wider field of engineering and science, and more specifically in fields ranging from materials technology to medicine. The disciplines involved in smart technologies makes this field one of the most interdisciplinary areas of engineering science and we hope that the different works presented at this conference provide an insight to the state of the art for smart technologies today and that the discussions might point directions for future research and collaboration among this community.

This Book of Abstracts collects the works presented at the conference, as well as the programme and other pertinent information. Altogether, more than 100 lectures are presented, including 8 plenary lectures and 4 keynote lectures, reflecting the current state of the art in research and advances in the field of smart structures and materials. The proceedings of SMART2015, which include the full papers, will be made available to all participants at the conference website <http://www.dem.ist.utl.pt/smart2015/>.

SMART2015 has been supported by IDMEC - Instituto de Engenharia Mecânica, the Government of the Azores, the City Hall of Ponta Delgada and Fundação Luso-Americana para o Desenvolvimento. We would like to take this opportunity to express our sincere appreciation to the authors and participants for their contributions, to the mini-symposium organizers and to all members of the organizing and scientific committees involved in the preparation of this conference. Also a special note of appreciation to Ms. Paula Jorge for her valuable contribution in all aspects related to the secretariat and preparation of the conference. The organizing committee is also grateful to the University of the Azores for hosting the conference and for all the logistic support provided.

**Welcome to the Azores, enjoy the conference and the breathtaking islands of the Azores!**

*Aurélio Araújo*  
*Carlos Mota Soares*



## Conference Organization

### Organizing Committee

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### SMART2015 has been supported by

**ECCOMAS** - European Community on Computational Methods in Applied Sciences

**IDMEC**- Institute of Mechanical Engineering

**UAç** - University of the Azores

**Azorean Regional Government**

**CMPD** - Câmara Municipal de Ponta Delgada

**Fundação Luso-Americana para o Desenvolvimento**

## Organizing Institution

IDMEC- Institute of Mechanical Engineering

The Organizers are grateful to the University of the Azores for hosting the conference and for all the logistic support.

## Conference Venue

SMART2015, 7th ECCOMAS Thematic Conference on Smart Structures and Materials takes place in the campus of the University of the Azores at Ponta Delgada, S. Miguel Island, Azores, Portugal in its Amphitheatres B and C (see map next page for rooms B and C).

## General Information

### *Secretariat Open Hours*

Wednesday, June 3, 8:00 – 17:00

Thursday, June 4, 8:30 – 17:00

Friday, June 5, 8:30 – 17:00

### *Secretariat*

Ms. Paula Jorge

### *Coffee-Breaks*

The coffee-breaks will take place in the hall next to Room C and will be open to all participants. Kindly wear your badge at all time.

### *Lunches*

The lunch tickets included in the registration package will be honoured at the restaurant of the VIP Executive Hotel. Note that the Restaurant tickets have different colours for the different days of the event and are only valid for the lunch of the day printed in front.

### *Registration*

On Tuesday, June 2, the Conference registration will take place at the VIP Executive Hotel, from 17:00 to 19:30. Registration Desk will be available also on Wednesday, June 3, from 08:00 to 08:30 at the Conference venue (University of the Azores, Ponta Delgada Campus), in the hall next to Room C.

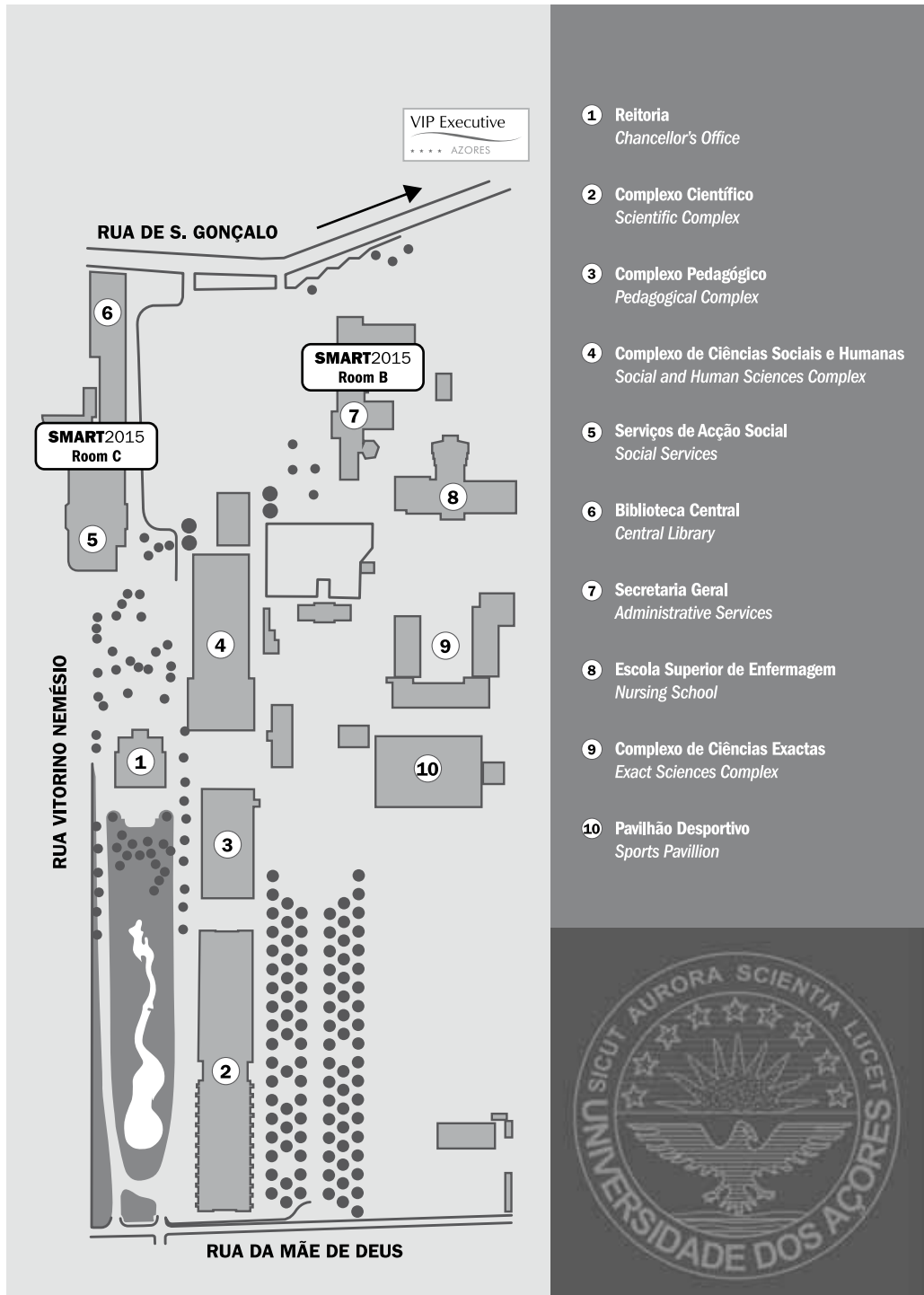
### *Presentations*

There will be a video projector and a laptop available in each room, as well as a laser pointer. You can bring your presentation either in MS Powerpoint or PDF. Regular presentations have the duration of 20 minutes, including discussion and Invited Lectures will have 45 minutes, also with discussion. We will have parallel sessions on the three days of the conference. We kindly ask delegates to upload their presentations in the available computers and to be at the assigned room before the session starts. We strongly discourage the use of personal laptops for presentations since this can cause perturbations to the programme schedule due to the technical problems that often arise.

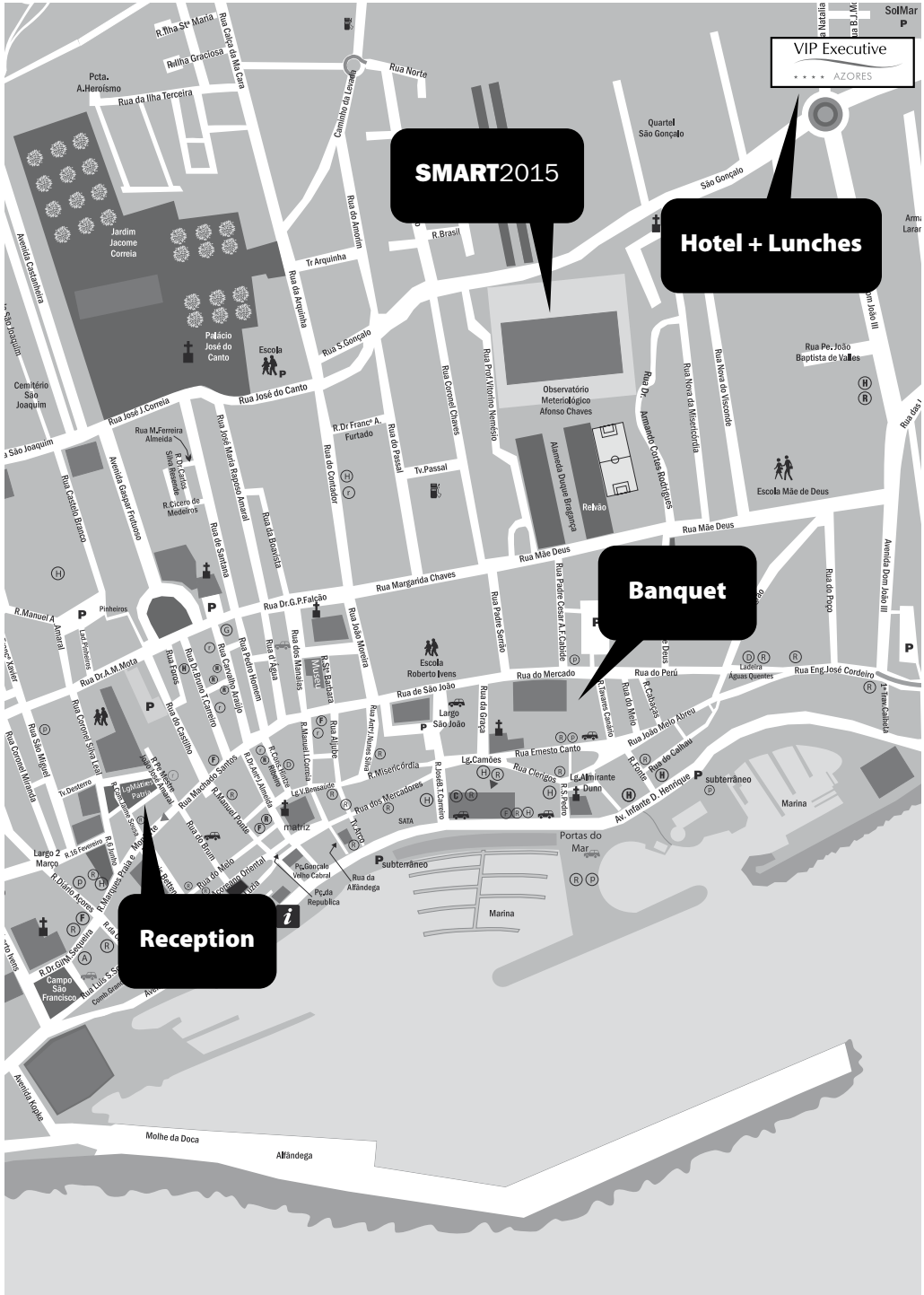
### *Internet*

There will be wireless access to the internet provided to all participants. Instructions on how to connect will be available on site. We will not have computers for public use of the participants. If you want to access the internet you should bring your own laptop or mobile device.

# University of the Azores, Ponta Delgada Campus



# Map of Ponta Delgada





## Conference Organization

### Important Note

Your Reception, Banquet and Tour Vouchers, included in the Registration package, need to be presented when entering the respective event.

### Reception

*Wednesday, June 3, 19:00-20:00*

The conference reception, offered by the Ponta Delgada City Hall on Wednesday, June 3, starting at 19:00, will take place at the Centro Municipal de Cultura. All participants and registered accompanying persons are invited. Centro Municipal de Cultura is located at Largo Mártires da Pátria (See also map on page 8) being 20 minutes walk from VIP Executive Hotel, or a short Taxi ride.

### Banquet

*Thursday, June 4, 20:00 - 23:00*

The Conference Banquet will take place at the Restaurant Solar da Graça on Thursday, June 4, starting at 20:00. The restaurant, located at Rua do Mercado 26, 9500-326 Ponta Delgada (See also Map on page 8), is a short walk from the VIP Executive Hotel.

### Conference Tour

*Saturday, June 6, 9:00-18:00*

The buses for the Tour will leave at 9:00 from the VIP Executive Hotel and will proceed to Lagoa do Fogo, Lagoa das Furnas, Terra Nostra Park and return to Ponta Delgada. Lunch, included in the Tour, will take place at the Terra Nostra Hotel and will include the famous Cozido das Furnas (a mix of vegetables and meats slowly cooked in the hot volcanic soil of the geyser region of Furnas). The Hot Springs and Natural Swimming Pools of Hot Water at the Terra Nostra Park and Hotel are an invitation for you to have a swim. So, you are welcome to take your swimming suit and towel and enjoy these Hot Waters.

For those that have flights leaving Ponta Delgada in the end of the day, bring your luggage to the Tour and you will be dropped at the airport by the end of the Tour, well in time for your scheduled flight.



## General Tourist Information

### Transportation from the Airport to Hotel

The most convenient transportation between the airport and the hotel is by Taxi. The ride, including the supplement for luggage, should be about 10€. The Taxi ride should take about 15 min.

### Moving Around

All sites of interest in Ponta Delgada are at walking distance from the hotel. For instance, the Historical City Center is about 15-20 min walking from the VIP Executive Hotel. The sea front (Portas do Mar) is 15 min walking. The city of Ponta Delgada is generally calm and safe. A Taxi ride inside the city should not be more than 5€ to get around between the hotel and University campus. Other public transportation (buses) is also available. If you plan to drive around the island of S.Miguel you can rent a car at the many locations in town (take notice of the places that will be visited in the Conference Tour). The best way is to get the car reservation through the desk of your hotel.

### Places of Interest in Ponta Delgada

All places of interest in Ponta Delgada are around the Historical City Center and along the sea front. You will find The City Gates; City Hall; Fortress of S. Brás; The Regional Government Palace (Palácio de Santana); Church of S. Peter; Church of S. Sebastian; Convent; Church of Christ; Portas do Mar.

### Other Places of Touristic Interest in the Island of S. Miguel

To drive all around the island may take more than one day. During the Conference tour the area Northeast and East of Ponta Delgada will be visited (except for the most Eastern part of the island). West of Ponta Delgada seats one of the ex-libris of Azores, Lagoa das Sete Cidades which has beautiful views not only from the top but also driving down into the actual village of the Sete Cidades. The drive of the Western and Northern shores of the island also present some amazing views. At least half a day is required for exploring this part of the island.

### Other General Information

Time zone: one hour less than GMT. Electricity: 220V, 50 Hz with standard European plugs. Currency: Euro (€). Emergency Phone number: 112. Temperature in early June: Average high about 21°C; Average low about 15°C. Other: Expect Rain, Expect Sun, Expect 4 seasons in a single day!

# SMART2015

7<sup>th</sup> ECCOMAS Thematic Conference  
on Smart Structures and Materials

## Scientific Programme

# Scientific Programme

	Tuesday - June 2	Wednesday - June 3		Thursday - June 4		Friday - June 5		Saturday - June 6
H	VIP Executive Hotel	Room B	Room C	Room B	Room C	Room B	Room C	
08:00		Registration						
08:25		Opening Ceremony						
08:30				Room C Plenary Lecture		Room C Plenary Lecture		
08:35				A. Güemes		A. Suleman		
08:40								
08:45								
08:50		Room C Plenary Lecture						
08:55		J.N. Reddy						
09:00								
09:05				Room C Plenary Lecture		Room C Plenary Lecture		
09:10				M. Sinapius		F. Auricchio		
09:15								
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09:35								
09:40		Room C Plenary Lecture						
09:45		A. Preumont						
09:50				Coffee Break		Coffee Break		
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**Tuesday, June 02****17:00 - 19:30**    **Registration** (*Vip Executive Hotel*)**Wednesday, June 03****08:00 - 08:30**    **Registration****08:30 - 08:50**    **Opening Ceremony** (*Room C*)**PLENARY LECTURES** (*Chair: Carlos Mota Soares*)**ROOM C****08:50 - 09:35***J.N. Reddy***MODELING OF FUNCTIONALLY GRADED SMART BEAMS AND PLATES WITH GEOMETRIC NONLINEARITY AND GRADIENT ELASTICITY EFFECTS****09:35 - 10:20***A. Preumont***SHAPE CONTROL OF OPTICAL REFLECTORS FOR SPACE AND EARTH APPLICATIONS****10:20 - 10:40****Coffee Break****PLENARY LECTURES** (*Chair: Christian Boller*)**ROOM C****10:40 - 11:25***R. Ohayon***INTELLIGENT ADAPTIVE FLUID-STRUCTURE INTERACTION SYSTEMS****11:25 - 12:10***J. Holnicki-Szulc***ADAPTIVE IMPACT ABSORPTION - POTENTIAL APPLICATIONS FOR SAFETY ENGINEERING****12:20 - 13:50****Lunch** (*VIP Executive Hotel*)**ROOM B****ROOM C****GS04****FABRICATION AND TESTING OF SMART STRUCTURES AND SYSTEMS I**  
(*Chair: Jan Høgsberg*)**GS05****APPLICATION OF SMART MATERIALS, STRUCTURES AND RELATED TECHNOLOGY I**  
(*Chair: António Torres Marques*)**13:50 - 14:10****ID012****ON THE ELECTROCHROMISM OF THIN MOO3-DOPED V2O5 FILMS PREPARED BY THE SOL-GEL METHOD**  
*He Wang, Manuel Costa, Shengnan Sun, Vasco Teixeira, Haining Cui***13:50 - 14:10****ID044****A PROTOTYPE MAGNETORHEOLOGICAL ELASTOMER FOR APPLICATION IN PROSTHETIC DEVICES**  
*F. Jonsdottir, F.B. Gudmundsson, K. H. Gudmundsson, C.Lecomte***14:10 - 14:30****ID026****FLAG-SHAPED BEHAVIOR DAMPER USING THE COMBINATION OF FRICTION AND RUBBER SPRINGS**  
*Eunsoo Choi, Gynchan Choi, Joowoo Kim, Kyoung-Taek Yang***14:10 - 14:30****ID045****LIGHTWEIGHT MATERIAL MODEL LIMITS WITH APPLIED PRE-STRESS**  
*Zdenek Neusser, Michael Valasek, Tomas Vampola*

14:30 - 14:50	<p><b>ID042</b> ON THE WALL SLIP OF MAGNETORHEOLOGICAL ELASTOMERS IN ROTATIONAL PARALLEL PLATE RHEOMETRY <i>Bastian Walter, Jean-Paul Pelteret, Joachim Kaschta, Dirk W. Schubert, Paul Steinmann</i></p>	14:30 - 14:50	<p><b>ID066</b> TOWARDS THE INDUSTRIAL APPLICATION OF MORPHING AIRCRAFT WINGS - DEVELOPMENT OF THE ACTUATION KINEMATICS OF A DROOP NOSE <i>Stefan Storm, Johannes Kirn</i></p>
14:50 - 15:10	<p><b>ID058</b> FABRICATION AND TESTING OF ELECTROACTIVE THERMOPLASTIC NANOCOMPOSITES <i>Paulina Latko, Rafał Kozera, Anna Boczkowska</i></p>	14:50 - 15:10	<p><b>ID080</b> AEROELASTIC INVESTIGATION USING PIEZOELECTRIC MATERIALS AS SENSOR AND ACTUATOR <i>Eder Oliveira, Roberto da Silva, Adolfo Marto, Frederico Afonso, Nuno Maia, Afzal Suleman</i></p>
15:10 - 15:30	<p><b>ID071</b> NEW APPROACHES FOR THE MANUFACTURING AND CHARACTERIZATION OF SMART STRUCTURES MADE OF FIBER REINFORCED PLASTICS <i>Benjamin Kelkel, Ron Sebastian, Moritz Hübler, Martin Gurka</i></p>	15:10 - 15:30	<p><b>ID097</b> MECHANICAL ENERGY MANAGEMENT FOR SEMI-ACTIVE DAMPING OF IMPACT BORNE VIBRATIONS <i>Arkadiusz Mróz, J. Holnicki-Szulc</i></p>
15:30 - 15:50	<p><b>ID072</b> ACTIVE CONTROL OF THE PASSIVE PITCHING AMPLITUDE OF A FLAPPING WING <i>Hugo Peters, Qi Wang, Hans Goosen, Fred van Keulen</i></p>	15:30 - 15:50	<p><b>ID161</b> MULTIBODY DYNAMIC MODEL FOR A TWO SPACECRAFT CONFIGURATION WITH A COMPOSITE MATERIAL DOCKING STRUCTURE <i>J. Ambrósio</i></p>
15:50 - 16:10	<b>Coffee Break</b>		
<b>ROOM B</b>		<b>ROOM C</b>	
<p><b>GS04</b> FABRICATION AND TESTING OF SMART STRUCTURES AND SYSTEMS II (Chair: Jorge Ambrósio)</p>		<p><b>GS10</b> ENERGY HARVESTING (Chair: Antonio Concilio)</p>	
16:10 - 16:30	<p><b>ID076</b> ONLINE MONITORING OF COMPOSITE OVERWRAPPED PRESSURE VESSELS (COPV) <i>Gilmar Pereira, Joana Figueiredo, Hugo Faria, António Torres Marques</i></p>	16:10 - 16:30	<p><b>ID016</b> CHARACTERIZATION OF SHEAR MODE PIEZOELECTRIC ENERGY HARVESTERS <i>Vainatey Kulkarni, Ridha Ben Mrad, Eswar Prasad, Sailendra Nemana, Sylvain Terzolo, Niru Somayajula</i></p>
16:30 - 16:50	<p><b>ID122</b> PHOTOCATALYTIC COMPOSITE MATERIALS BASED ON GRAPHENE AND TITANIUM OXIDE PREPARED BY DIFFERENT METHODS <i>Jakub Tolasz, Vaclav Stengl, Petr Vomáčka, Jana Bludská</i></p>	16:30 - 16:50	<p><b>ID090</b> AN ANALYTICAL STUDY ON PIEZOELECTRIC-BISTABLE LAMINATES WITH ARBITRARY SHAPES FOR ENERGY HARVESTING <i>Mehdi Tavakkoli, Paul M Weaver, Christopher R. Bowen, Daniel J. Inman, H Alicia Kim</i></p>

16:50 - 17:10	<b>ID132</b> EXPERIMENTAL-THEORETICAL RESEARCH OF MECHANICAL PROPERTIES OF SMART-COMPOSITES <i>Aleksandr Anosbkin, Valerii Zuiko, Gleb Shipunov</i>	16:50 - 17:10	<b>ID095</b> NUMERICAL SIMULATION OF ENERGY HARVESTING DEVICES DRIVEN BY FLUID-STRUCTURE INTERACTION <i>Andreas Zilian, Srivathsan Ravi</i>
17:10 - 17:30	<b>ID140</b> EXPERIMENTAL INVESTIGATION ON THERMOPLASTIC POLYURETHANE HAVING PARTIAL SHAPE MEMORY EFFECT <i>Sofiane Abdallah-Elbirtsi, Joseph Fitoussi, Baralu Jagannatha Rashmi, Kalappa Prashantha, Sedigheh Farzaneh, Marie-France Lacrampe, Patricia Krawczak, Abbas Tcharkhtchi</i>	17:10 - 17:30	<b>ID147</b> POWER OPTIMIZATION FOR PIEZOELECTRIC VIBRATIONS ENERGY HARVESTERS WITH MATERIAL TAILORING <i>Agostinho Matos, José Guedes, Kuzbichalil Jayachandran, Hélder Rodrigues</i>
<b>GS06</b> SMART STRUCTURES IN MECHATRONICS (Chair: Jorge Ambrósio)		<b>GS01</b> FUNDAMENTALS OF SMART MATERIALS AND STRUCTURES (Chair: Antonio Concilio)	
17:30 - 17:50	<b>ID32</b> MOTION DESCRIPTION OF MECHATRONIC FLEXIBLE JOINT <i>Michael Valasek, Vaclav Bauma, Tomas Vampola</i>	17:30 - 17:50	<b>ID007</b> ELECTRO-KINETIC STRUCTURE MODELS WITH INTERFACIAL REACTIONS <i>Victor A. Kovtunencko</i>
17:50 - 18:10	<b>ID86</b> NUMERICAL SIMULATION OF BEHAVIOUR AND EXPERIMENTAL VERIFICATION OF PNEUMATIC AND SMA ACTUATORS IN HYPER-MOBILE PNEUMATIC JOINT <i>Erik Prada, Michael Valasek, Grzegorz Granosik</i>	17:50 - 18:10	<b>ID008</b> PHENOMENOLOGICAL AND PHYSICALLY MOTIVATED CONSTITUTIVE MODELS FOR FERROMAGNETIC AND MAGNETOSTRICTIVE MATERIALS <i>Artjom Avakian, Andreas Ricoeur</i>
18:10 - 18:30	<b>ID129</b> LEAKAGE DETECTION IN PIPELINES - THE CONCEPT OF SMART WATER SUPPLY SYSTEM <i>Andrzej Klepka, Dariusz Broda, Jerzy Michalik, Michal Kubat, Piotr Malka, Wiesław J Staszewski, Tadeusz Stepinski</i>	18:10 - 18:30	<b>ID010</b> MECHANICAL DEGRADATION AND LIFETIME PREDICTION OF TETRAGONAL FERROELECTRICS UNDER CYCLIC ELECTROMECHANICAL LOADING <i>Stephan Lange, Andreas Ricoeur</i>
19:00 - 20:00	<b>Welcome Reception at City Hall</b>		
<b>Thursday, June 04</b>			
<b>PLENARY LECTURES</b> (Chair: Eswar Prasad)			<b>ROOM C</b>
08:30 - 09:15	A. Güemes SHM AND NDT FOR COMPOSITE AIRCRAFT STRUCTURES		

09:15 - 10:00	<i>M. Sinapius</i> DLR'S RESEARCH IN SMART STRUCTURES FOR AERONAUTICAL APPLICATIONS		
10:00 - 10:20	Coffee Break		
<b>ROOM B</b>		<b>ROOM C</b>	
<b>GS02</b> MODELING/FORMULATION AND CHARACTERIZATION OF SMART ACTUATORS, SENSORS AND SMART MATERIAL SYSTEMS I (Chair: Olivier Polit)		<b>MS04</b> PIEZOELECTRIC SENSORS, ACTUATORS & TRANSDUCERS FOR STRUCTURAL CONTROL AND HEALTH MONITORING I (Chairs: Ayeche Benjeddou ; Michael Krommer)	
10:20 - 10:40	<b>ID011</b> NUMERICAL ANALYSIS OF FRACTURE OF FERROELECTRIC ACTUATOR TAKING INTO ACCOUNT COHESIVE ZONE FOR DAMAGE ACCUMULATION <i>Sergii Kozinov, Meinhard Kuna</i>	10:20 - 10:50	<b>ID113 Keynote</b> MODAL COUPLING RESPONSE SURFACE CONCEPT FOR SMART STRUCTURES MULTI-PATCH POSITIONING <i>Ayech Benjeddou</i>
10:40 - 11:00	<b>ID017</b> DESIGN OF CONTROL CONCEPTS FOR A SMART BEAM STRUCTURE WITH REGARD TO SENSITIVITY ANALYSIS OF THE SYSTEM <i>Sushan Li, Steffen Ochs, Tobias Melz</i>	10:50 - 11:10	<b>ID009</b> THE NONLINEAR PIEZOELECTRIC TUNED VIBRATION ABSORBER <i>Payam Soltani, Gaetan Kerschen</i>
11:00 - 11:20	<b>ID029</b> A FINITE ELEMENT WITH CONTINUOUS TRANSVERSE ELECTRIC DISPLACEMENT FOR STATIC AND FREE-VIBRATION ANALYSIS OF PIEZOELECTRIC SHELLS <i>Maria Cinefra, Stefano Valvano, Erasmus Carrera</i>	11:10 - 11:30	<b>ID013</b> EXPERIMENTAL INVESTIGATIONS TO ENHANCE THE BUCKLING LOAD OF SLENDER BEAMS <i>Georg Zenz, Alexander Humer</i>
11:20 - 11:40	<b>ID033</b> INFLUENCE OF THE STRUCTURAL NON-LINEARITY ON THE PERFORMANCE OF AN ELECTRET BASED VIBRATION ENERGY HARVESTER <i>Eugenio Brusa, Mircea Gheorghe Munteanu</i>	11:30 - 11:50	<b>ID036</b> THE FINITE CELL METHOD FOR ARBITRARY TETRAHEDRAL MESHES: SMART STRUCTURE APPLICATIONS <i>Sascha Duczek, Ulrich Gabbert</i>
11:40 - 12:00	<b>ID038</b> MODELING OF THE ELECTRO-CHEMICAL BEHAVIOR OF CHEMICALLY STIMULATED HYDROGEL LAYER SYSTEMS <i>Martin Wild, Thomas Wallmersperger</i>	11:50 - 12:10	<b>D037</b> PIEZOELECTRIC RL SHUNT DAMPING OF FLEXIBLE STRUCTURES <i>Jan Høgsberg, Steen Krenk</i>
12:00 - 12:20	<b>ID039</b> NONLINEAR ELECTROCALORIC AND THERMOMECHANICAL EFFECTS IN FERROELECTRICS AND THEIR INFLUENCE ON DAMAGE AND CONSTITUTIVE BEHAVIOR <i>Marius Wingen, Roman Gellmann, Andreas Ricoeur</i>	12:10 - 12:30	<b>ID054</b> THIN SHELLS WITH PIEZOELECTRIC TRANSDUCERS: THEORY, NUMERICAL MODELLING AND EXPERIMENTAL VERIFICATION <i>Michael Pieber, Michael Krommer, Yury Vetyukov</i>



12:30 - 14:00	<b>Lunch</b> ( <i>VIP Executive Hotel</i> )	
	<b>ROOM B</b>	<b>ROOM C</b>
	<b>MS04</b> PIEZOELECTRIC SENSORS, ACTUATORS & TRANSDUCERS FOR STRUCTURAL CONTROL AND HEALTH MONITORING II ( <i>Chairs: A.Benjeddou ; Michael Krommer</i> )	<b>MS01</b> MONITORING AND CONTROL OF CIVIL STRUCTURES I ( <i>Chairs: Álvaro Cunha ; Carlos Moutinho</i> )
14:00 - 14:20	<b>ID055</b> SPATIAL COMPATIBILITY FILTERS FOR STRUCTURAL HEALTH MONITORING <i>Markus Zellhofer, Michael Krommer</i>	14:00 - 14:30 <b>ID133 Keynote</b> IMPLEMENTATION OF A SEMI-ACTIVE TUNED MASS DAMPER TO REDUCE VIBRATIONS IN A SLENDER FOOTBRIDGE <i>Carlos Moutinho, Álvaro Cunha, Jorge Martins de Carvalho</i>
14:20 - 14:40	<b>ID067</b> EXTREME PERFORMANCES OF PIEZO SYSTEM: HIGH STROKE, HIGH FREQUENCY, HIGH TEMPERATURE <i>Aleksander Kras, Olivier Sosnicki, Steven Rowe, Francesca Battistello, Frank Claeysen</i>	14:30 - 14:50 <b>ID034</b> INTELLIGENT BRIDGES - ADAPTIVE CONCEPTS FOR HOLISTIC CONDITION EVALUATION <i>Abdalla Fakhouri, Peter Haardt</i>
14:40 - 15:00	<b>ID091</b> TAILORED MULTILAYER STACK ACTUATORS FOR HARSH ENVIRONMENT <i>Christian Behr, Fabian Lippmann, Peter Wierach, Michael Sinapius</i>	14:50 - 15:10 <b>ID057</b> DECENTRALIZED OVERLAPPING CONTROL FOR CIVIL STRUCTURES <i>Lubomír Bakule, Martin Papík, Branislav Reháč</i>
15:00 - 15:20	<b>ID092</b> ACTIVE STRUCTURAL ACOUSTIC CONTROL OF GEAR NOISE USING A PAIR OF PIEZO-BASED ROTATING INERTIAL ACTUATORS <i>Guoying Zhao, Neven Alujevic, Bruno Depraetere, Paul Sas</i>	15:10 - 15:30 <b>ID088</b> FAULT TOLERANT CONTROL FOR WIND TURBINE PITCH ACTUATORS <i>Jose Rodellar, Leonardo Acho, Christian Tutiven, Yolanda Vidal</i>
15:20 - 15:40	<b>ID125</b> IMPACT DAMAGE DETECTION IN COMPOSITE LAMINATE PLATES USING AN INTEGRATED PIEZOELECTRIC SENSOR AND ACTUATOR COUPLE COMBINED WITH WAVELET-BASED FEATURES EXTRACTION APPROACH <i>Paolo Gaudenzi, Davide Nardi, Ilaria Chiappetta, Sofiane Atek, Luca Lampani, Fabrizio Sarasini, Jacopo Tirillò, Teodoro Valente</i>	15:30 - 15:50 <b>ID104</b> STRUCTURAL DAMAGE QUANTIFICATION BASED ON RECURRENCE PLOTS AND RELAXATION METHOD OF PARTICLE FILTER <i>Yasutoshi Nomura, Tadanobu Sato, Hitoshi Furuta</i>
15:40 - 16:10	<b>Coffee Break</b>	

ROOM B		ROOM C	
<b>MS04</b> PIEZOELECTRIC SENSORS, ACTUATORS & TRANSDUCERS FOR STRUCTURAL CONTROL AND HEALTH MONITORING III (Chairs: A.Benjeddou ; Michael Krommer)		<b>MS01</b> MONITORING AND CONTROL OF CIVIL STRUCTURES II (Chairs: Álvaro Cunha ; Carlos Moutinho)	
16:10 - 16:30	<b>ID126</b> ADAPTIVE INDUCTOR FOR VIBRATION DAMPING IN PRESENCE OF UNCERTAINTY <i>Bilal Mokrani, Ioan Burda, Zhui Tian, Andre Preumont</i>	16:10 - 16:30	<b>ID111</b> COMPUTATIONAL STATISTICAL MONITORING OF HYDROCARBON TRANSPORTATION LINES <i>Magda Ruiz, Luis Eduardo Mujica Delgado, Juan Manuel Mejia</i>
16:30 - 16:50	<b>ID138</b> DAMAGE DETECTION IN STRUCTURES USING ROBUST BASELINE MODELS <i>Jhonatan Camacho, Magda Ruiz, Rodolfo Villamizar, Luis Eduardo Mujica Delgado, Fernando Martinez</i>	16:30 - 16:50	<b>ID121</b> GUIDED ULTRASONIC WAVE FOR MONITORING STRESS LEVELS IN PIPELINES <i>Jabid Quiroga Méndez, Rodolfo Villamizar, Luis Eduardo Mujica Delgado, John Quiroga, Magda Ruiz</i>
		16:50 - 17:10	<b>ID137</b> INTEGRATED LIFE CYCLE MANAGEMENT OF AGEING STEEL INFRASTRUCTURE BASED ON SMART TECHNOLOGIES <i>Christian Boller, Chen-Ming Kuo, Georg Seiler, Przemyslaw Kolakowski, Chung-Hsin Kuo, Peter Starke, Jan Holnicki-Szulc</i>
<b>GS07</b> MORPHING WINGS AND SMART AIRCRAFT I (Chair: Afzal Suleman)		<b>GS08/GS09</b> BIOMIMETIC PHENOMENA AND THEIR INSPIRATION IN ENGINEERING/BIO MEDICAL APPLICATIONS (Chair: Kaspar Jansen)	
16:50 - 17:10	<b>ID014</b> CONTROL SYSTEM DESIGN FOR A MORPHING WING TRAILING EDGE <i>Ignazio Dimino, André Gratias, Martin Schueller, Monica Ciminello, Pecora Rosario, Antonio Concilio</i>	17:10 - 17:30	<b>ID023</b> BIOLOGICALLY INSPIRED PROPULSION OF MICRO-AIR VEHICLES <i>Jorge Barata, Pedro Manquinho, Fernando Neves, André Silva</i>
17:10 - 17:30	<b>ID027</b> A HYBRID TRAILING EDGE CONTROL SURFACE CAPABLE OF CAMBER AND DECAMBER MORPHING <i>İlhan Ozan Tunçöz, Yoseph Yang, Ercan Gürses, Melin Şahin, Serkan Özgen, Yavuz Yaman</i>	17:30 - 17:50	<b>ID089</b> MODELING AND VALIDATION TEST OF UNDERACTUATED ROBOTIC FINGER <i>José Ramirez, Astrid Rubiano, Laurent Gallimard, Mohammed Nabil El Korso, Nicolas Jouandeau, Olivier Polit</i>
17:30 - 17:50	<b>ID061</b> EXPERIMENTAL INVESTIGATION OF A COMPLIANT MECHANISM FOR AN UAV LEADING EDGE <i>Martin Radestock, Johannes Riemenschneider, Hans Peter Monner, Michael Rose</i>	17:50 - 18:10	<b>ID134</b> FORWARD KINEMATIC MODELING OF CONSTANT CURVATURE CONTINUUM ROBOTS USING DUAL QUATERNIONS <i>Lorenzo Toscano, Gabriele Cazzulani, Francesco Braghin</i>

17:50 - 18:10	<b>ID093</b> POLYMER BASED MORPHING SKIN FOR ADAPTIVE WINGS <i>Oliver Schorsch, Andreas Lübring, Christof Nagel, Pecora Rosario, Ignazio Dimino</i>	18:10 - 18:30	<b>ID164</b> SMART FLOW-CONTROL ACTUATORS PROTOTYPING BIOMIMMETIC PHENOMENA <i>Nina Yurchenko</i>
20:00 - 23:00	<b>Banquet</b> (Restaurante Solar da Graça)		
<b>Friday, June 05</b>			
<b>PLENARY LECTURES</b> (Chair: Cristóvão Mota Soares)			<b>ROOM C</b>
08:30 - 09:15	A. Suleman SMART STRUCTURES AND MATERIALS: VISIONS, PROMISES AND CHALLENGES IN AERONAUTICS		
09:15 - 10:00	F. Auricchio SHAPE-MEMORY ALLOY: MODELING AND DESIGNING SMA-BASED DEVICES		
10:00 - 10:20	<b>Coffee Break</b>		
<b>ROOM B</b>		<b>ROOM C</b>	
<b>GS02</b> MODELING/FORMULATION AND CHARACTERIZATION OF SMART ACTUATORS, SENSORS AND SMART MATERIAL SYSTEMS II (Chair: Maria Cinefra)		<b>MS02</b> NOVEL METHODS IN SHM TECHNOLOGY (Chair: Wieslaw Ostachowicz)	
10:20 - 10:40	<b>ID050</b> NUMERICAL AND EXPERIMENTAL INVESTIGATION OF SHAPE MEMORY ALLOYS SUBJECT TO COMPLEX MECHANICAL LOADING: A CASE STUDY OF A NITI HELICAL SPRING <i>Miroslav Frost, Petr Sedlak, Lukas Kaderavek, Ludek Heller</i>	10:20 - 10:50	<b>ID053 Keynote</b> ASSESSMENT METHODS FOR COMPOSITE AEROSPACE STRUCTURES <i>Tomasz Wandowski, Pawel Malinowski, Maciej Radzienski, Szymon Opoka, Wieslaw Ostachowicz</i>
10:40 - 11:00	<b>ID063</b> THERMAL MODEL FOR A SMART COOLING VEST FOR WOMEN WITH HOT FLASHES <i>Kaspar Jansen, Geertje Hofstee, Marco Rozendaal</i>	10:50 - 11:10	<b>ID052</b> STATISTICAL ANALYSIS FOR PIEZO-BASED STRUCTURAL DAMAGE DETECTION USING ENHANCED NONLINEAR CRACK-WAVE INTERACTIONS <i>Kajetan Dziedzic, Konrad Żołna, Lukasz Pieczonka, Wiesław J. Staszewski, Piotr Kijanka</i>
11:00 - 11:20	<b>ID082</b> ACTUATED TENSILE TESTING OF CNT BASED ARCHITECTURES <i>Sebastian Geier, Thorsten Mahrholz, Peter Wierach, Michael Sinapius</i>	11:10 - 11:30	<b>ID059</b> OBSERVATION OF CONTINUOUS MODE CONVERSION OF LAMB WAVES IN COMPOSITE PLATES FOR SHM <i>Bianca Hennings, Rolf Lammering</i>

11:20 - 11:40	<b>ID087</b> HIGH ORDER PLATE/SHELL FE FOR PIEZOELECTRIC ANALYSIS: THE BIMORPH CONFIGURATION <i>Olivier Polit, Michele d'Ottavio, Philippe Vidal</i>	11:30 - 11:50	<b>ID064</b> KISSING BONDS MONITORING USING NONLINEAR VIBRO-ACOUSTIC WAVE MODULATIONS <i>Wiesław J Staszewski, Karol Swiercz, Lukasz Pieczonka, Dariusz Broda, Andrzej Klepka</i>
11:40 - 12:00	<b>ID102</b> MODELLING THE CONSTITUTIVE BEHAVIOUR OF MARTENSITE AND AUSTENITE IN SHAPE MEMORY ALLOYS USING CLOSED - FORM ANALYTICAL CONTINUOUS EQUATIONS <i>Arathi Pai, Thomas Niendorf, Phillip Krooss, Isabel Koke, Ansgar Trächtler, Mirko Schaper</i>	11:50 - 12:10	<b>ID101</b> DETECTION OF STRUCTURAL CHANGES THROUGH PRINCIPAL COMPONENT ANALYSIS AND MULTIVARIATE STATISTICAL INFERENCE <i>Francesco Pozo, Ignacio Arruga, Luis Eduardo Mujica Delgado, Elena Podivilova</i>
12:00 - 12:20	<b>D106</b> MULTISTABILITY OF PLATES THROUGH VARIABLE STIFFNESS COMPOSITES USING RAYLEIGH RITZ METHOD <i>Ayan Haldar, Jose Reinoso, Eelco Jansen, Raimund Rolfes</i>	12:10 - 12:30	<b>ID139</b> FINITE ELEMENT ANALYSIS FOR STRUCTURAL HEALTH MONITORING OF HELICOPTER AIRFRAMES <i>Francisco Javier San Millan Fiel, Malte Frovel, Roberto Gonzalez</i>
12:30 - 14:00	Lunch (Vip Executive Hotel)		
<b>ROOM B</b>		<b>ROOM C</b>	
<b>GS05</b> APPLICATION OF SMART MATERIALS, STRUCTURES AND RELATED TECHNOLOGY II (Chair: Afzal Suleman)		<b>GS03</b> DESIGN AND DEVELOPMENT OF SMART STRUCTURES AND SYSTEMS I (Chair: José Rodellar)	
14:00 - 14:20	<b>ID098</b> A MORPHING TRAILING EDGE FLAP SYSTEM FOR WIND TURBINE BLADES <i>Helge Aagaard Madsen, Thanasis Barlas, Tom Løgstrup Andersen</i>	14:00 - 14:30	<b>ID040 Keynote</b> SMART FUNCTIONAL NANOSYSTEMS: POLYMER MEMBRANES DECORATED WITH PROTEINS <i>Cornelia Palivan, Mariana Spulber</i>
14:20 - 14:40	<b>ID100</b> MULTI-POINT CONTROL METHOD FOR REDUCTION OF THERMAL GRADIENTS IN FOIL BEARINGS BASED ON THE APPLICATION OF SMART MATERIALS <i>Jakub Roemer, Michal Lubieniecki, Adam Martowicz, Tadeusz Uhl</i>	14:30 - 14:50	<b>ID006</b> ROBUST CONTROLLER FOR THE VIBRATION SUPPRESSION OF AN ACTIVE PIEZOELECTRIC BEAM <i>Tamara Nestorovic, Atta Oveisi</i>

14:40 - 15:00	<b>ID109</b> A PROCEDURE TO EVALUATE RELIABILITY OF MEASUREMENTS IN A SMART STRUCTURE <i>Gabriele Cazzulani, Simone Cinquemani, Marco Ronchi, Francesco Braghin</i>	14:50 - 15:10	<b>ID021</b> EFFICIENT EXPERIMENTAL VALIDATION OF STOCHASTIC SENSITIVITY ANALYSES OF SMART SYSTEMS <i>Steffen Ochs, Sushan Li, Christian Adams, Tobias Melz</i>
<b>GS07</b> MORPHING WINGS AND SMART AIRCRAFT II (Chair: Afzal Suleman)			
15:00 - 15:20	<b>ID094</b> DESIGN, MANUFACTURE, AND TESTING OF A SEAMLESS MORPHING CONCEPT FOR A SMART AIRCRAFT WINGTIP <i>Christof Nagel, Arne Fiedler, Oliver Schorsch, Andreas Lühring</i>	15:10 - 15:30	<b>ID068</b> A NEW STRATEGY FOR ADAPTIVE IMPACT ABSORPTION (AIA) <i>Łukasz Jankowski, Jan Holnicki-Szulc, Arkadiusz Mróz</i>
15:20 - 15:40	<b>ID107</b> DEVELOPMENT OF AN ACTUATED CORRUGATED LAMINATE FOR MORPHING SKIN <i>Alessandro Airolidi, Paolo Panichelli, Elena Borlandelli, Paolo Bettini, Elena Villa, Adelaide Nespoli</i>	15:30 - 15:50	<b>ID070</b> SMART WHEEL-BASED STAIR-CLIMBING ROBOT <i>Bruno Strab, Stephan Rinderknecht</i>
15:50 - 16:10	<b>Coffee Break</b>		
<b>ROOM B</b>		<b>ROOM C</b>	
<b>GS11</b> MATERIALS ASPECTS (Chair: Mariana Spulber)		<b>GS03</b> DESIGN AND DEVELOPMENT OF SMART STRUCTURES AND SYSTEMS II (Chair: Helge Aagaard Madsen)	
16:10 - 16:30	<b>ID018</b> AN INVESTIGATION ON THE CRYSTAL STRUCTURES OF Ti50Ni50-XCUX SHAPE MEMORY ALLOYS BASED ON DENSITY FUNCTIONAL THEORY CALCULATIONS <i>Liangliang Gou, Yong Liu, Teng Yong Ng</i>	16:10 - 16:30	<b>ID074</b> ACTIVE BUCKLING CONTROL OF AN AXIALLY LOADED BEAM-COLUMN WITH CIRCULAR CROSS-SECTION BY ACTIVE SUPPORTS WITH INTEGRATED PIEZOELECTRIC ACTUATORS <i>Maximilian Schaeffner, Roland Platz, Tobias Melz</i>
16:30 - 16:50	<b>ID022</b> DESIGN OF MAGNETIC PROPERTIES OF GLASS-COATED MICROWIRES FOR MAGNETIC SENSORS APPLICATIONS <i>Arcady Zhukov, Mihail Ipatov, Ahmed Talaat, Valentina Zhukova</i>	16:30 - 16:50	<b>ID075</b> LATERAL VIBRATION ATTENUATION OF A BEAM WITH CIRCULAR CROSS-SECTION BY SUPPORTS WITH INTEGRATED RESONANTLY SHUNTED PIEZOELECTRIC TRANSDUCERS <i>Benedict Götz, Roland Platz, Tobias Melz</i>

16:50 - 17:10	<b>ID025</b> INFLUENCE OF THE INHOMOGENEITIES ON MAGNETIC PROPERTIES OF GLASS-COATED MICROWIRES <i>Valentina Zhukova, Evgenia Shuvaeva, Margarita Churyukanova, Sergey Kaloshkin, Mihail Ipatov, Ahmed Talaat, Arcady Zhukov</i>	16:50 - 17:10	<b>ID077</b> ENRICHING MECHATRONIC V-MODEL BY ASPECTS OF SYSTEMS ENGINEERING <i>Iris Graessler, Julian Hentze</i>
17:10 - 17:30	<b>ID051</b> EFFECT OF ACCELERATED AGEING ON MAGNETORHEOLOGICAL ELASTOMER PROPERTIES <i>Anna Boczkowska, Joanna Kozłowska, Stefan Awietjan</i>	17:10 - 17:30	<b>ID096</b> OPTIMAL PLACEMENT OF ACTUATORS BASED ON LOAD CARRYING BEHAVIOR <i>Malte von Scheven, Charlotte Bofinger, Manfred Bischoff</i>
17:30 - 17:50	<b>ID069</b> CFRP WITH EMBEDDED MAGNETORHEOLOGICAL ELASTOMER FOR ADAPTIVE DAMPING OF THE VIBRATION <i>Bartłomiej Przybyszewski, Anna Boczkowska, Maik Gude, Joanna Kozłowska, Andrzej Czulak, Paulina Chabera</i>	17:30 - 17:50	<b>ID105</b> THERMAL DEFORMATION SUPPRESSION OF LARGE SMART STRUCTURE VIA ACTUATORS' FORCE OPTIMIZATION <i>Ahmed Elswaf, Tomas Vampola</i>
		<b>GS02</b> MODELING/FORMULATION AND CHARACTERIZATION OF SMART ACTUATORS, SENSORS AND SMART MATERIAL SYSTEMS III <i>(Chair: Michele d'Ottavio)</i>	
17:50 - 18:10	<b>ID079</b> INVESTIGATION ON LAMINATED MAGNETOELECTRIC COMPOSITE STRUCTURE MATERIAL <i>Jerzy Kaleta, Daniel Lewandowski, Rafał Mech, Karolina Woźniak</i>	17:50 - 18:10	<b>ID157</b> CHARACTERIZATION OF SMART FLUID DAMPERS USING RESTORING FORCE SURFACE METHOD BASED ON ACCELERATION FEEDBACK <i>Hassan Metered, Martin Kozek, Zbynek Sika</i>
18:10 - 18:30	<b>ID123</b> HIGH-VELOCITY IMPACTS ON AEROSPACE THIN COMPOSITE LAMINATES <i>Consuelo Terra, Michele Pasquali, Paolo Gaudenzi</i>	18:10 - 18:30	<b>ID162</b> PIEZOELECTIC COMPOSITE PLATE MODELLING <i>M. Husic, A.L. Araújo</i>
		18:30 - 18:50	<b>ID163</b> VIBRATION ATTENUATION IN LAMINATED SOFT CORE SANDWICH PANELS WITH ACTIVE PIEZOELECTRIC ELEMENTS <i>V.S. Carvalho, A.L. Araújo, C.M. Mota Soares, C.A. Mota Soares, A.J.M. Ferreira</i>
<b>Saturday, June 06</b>			
9:00 - 18:00	<b>Tour to S. Miguel Island</b>		