

# **CONTROLO'2012**



## **Program of the 10<sup>th</sup> Portuguese Conference on Automatic Control**

**16-18 July 2012, Funchal  
Madeira Island, Portugal**

**<http://www.uma.pt/controlo2012>**

# Conference Program

Monday, July 16, 2012

Hours / Room	Conference Event
9:00 am - 10:00 am	<b>Registration</b>
10:00 pm - 11:00 am	Plenary Session: <b>Prof. Jose Carlos Principe</b> Room: A1 / Title: Optimal Kernel Filtering for System Identification
11:00 pm - 11:30 am	Coffee-break
11:30 pm - 12:50 am	<b>Paralell Sessions</b> Room: A1 Neural Networks 1 (NN1), Chair: Alberto Cardoso Room: A2 Linear and Nonlinear Control (LNC), Chair: Fátima Silva Leite
12:50 pm - 14:20 am	Lunch Break
14:20 pm - 16:00 am	<b>Paralell Sessions</b> Room: A1 Modelling Identification and Simulation (MIS), Chair: Alessandro Vargas Room: A2 Renewable and Efficient Energy Use (RE), Chair: Rui Neves da Silva
16:00 pm - 16:30 am	Coffee-break
16:30 pm - 18:30 am	<b>Paralell Sessions</b> Room: A1 Control Applications 1 (CA1), Chair: Isabel Brás Room: A2 Process Control (PC), Chair: Lemos Pinto
19:00 pm - 20:00 am	Welcome Cocktail at Town Hall Honours Room

## Tuesday, July 17, 2012

Hours / Room	Conference Event
9:30 pm - 10:30 am	Plenary Session: <b>Prof. João Miranda Lemos</b>
Room: A1 / Title:	Distributed Control of Water Delivery Canals
10:30 pm - 11:00 am	Coffee-break
11:00 pm - 13:00 am	<b>Paralell Sessions</b>
Room: A1	Invited Session: <b>Coordinated Control Water Delivery Canals</b>
	Chairs: Miranda Lemos, Ayala Botto, Rui Neves da Silva
Room: A2	Wireless Applications (WA), Chair: José Alberto Fonseca
12:30 pm - 14:00 am	Lunch Break
14:00 pm - 15:00 am	Plenary Session: <b>Prof. Luis Rodrigues</b>
Room: A1 / Title:	Networked Control Systems: a Wireless Multirate Perspective
15:00 pm - 15:20 am	Coffee-break
15:20 pm - 17:00 am	<b>Paralell Sessions</b>
Room: A1	Marine Control and Robotics (MCR), Chair: A. Pedro Aguiar
Room: A2	Control Applications 2 (CA2), Chair: Marek Miskowicz
17:00 pm - 18:00 am	<b>APCA General Assembly (members only)</b>

## Wednesday, July 18, 2012

Hours / Room	Conference Event
9:30 pm - 10:30 am	Plenary Session: <b>Prof. José Alberto Fonseca</b>
Room: A1 / Title:	Distributed Control of Water Delivery Canals
10:30 pm - 11:00 am	Coffee-break
11:00 pm - 13:20 am	<b>Paralell Sessions</b>
Room: A1	Neural Networks 2 (NN2), Chair: Antonio Moran Alvarez
Room: A2	Optimal Control (OC), Chair: José Jaime da Cruz
12:30 pm - 14:00 am	Lunch Break
15:00 pm - 18:00 am	<b>Social Event</b>

# MONDAY, JULY 16th

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## 10:00 - 11:00 – Plenary session

Optimal Kernel Filtering for System Identification.

**Prof. José Carlos Príncipe**

**Room: A1**

## 11:00 - 11:30 Coffee Break

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## 11:30 - 12:50 Parallel Sessions

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### Neural Networks 1 (NN1)

**Chair:** Alberto Cardoso

**Room:** A1

GAINS TUNING OF FUZZY CONTROLLERS BASED ON A COST FUNCTION OPTIMIZATION. *C. Lucena, L. Palma, A. Cardoso and P. Gil*

ARTIFICIAL NEURAL NETWORKS IN THE SCOPE OF OPTICAL PERFORMANCE MONITORING. *Vitor Ribeiro, Mário Lima and António Teixeira*

ARTIFICIAL NEURAL NETWORKS – A SURVEY ABOUT HARDWARE AND SOFTWARE USE. *Darío Baptista, Filipe Freitas, Rita Vasconcelos and Fernando Morgado-Dias*

ARTIFICIAL NEURAL NETWORKS: A REVIEW OF TRAINING TOOLS. *Darío Baptista and Fernando Morgado-Dias*

### Linear and Nonlinear Control (LNC)

**Chair:** Fátima Silva Leite

**Room:** A2

ROLLING A PSEUDOHYPERBOLIC SPACE OVER THE AFFINE TANGENT SPACE AT A POINT. *André Marques and Fátima Silva Leite*

WHY CONTROLLABILITY OF ROLLING MOTIONS MAY FAIL. *Krzysztof Andrzej Krakowski and Fátima Silva Leite*

EXTENDED NONHOLONOMIC SYSTEMS WITH DRIFT. *Sandra Ricardo*

A COMPARATIVE ANALYSIS OF TRACKING QUALITY FOR CDM AND PID CONTROL. *Wojciech Giernacki*

## 12:50 - 14:20 Lunch Break

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## 14:20 - 16:00 Parallel Sessions

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### Modelling Identification and Simulation (MIS)

**Chair:** Alessandro Vargas

**Room:** A1

LOIRAL WIND PARK MODELLING USING ARTIFICIAL NEURAL NETWORKS. *Dário Fernandes, Darío Baptista, Beatriz Jardim, Agostinho Figueira and Fernando Morgado-Dias*

ONLINE DAMAGE DETECTION IN EULER-BERNOULLI BEAMS USING THE EXTENDED KALMAN FILTER. *Juliana Almeida, Hugo Alonso and Paula Rocha*

MODELING OMNIDIRECTIONAL MOBILE ROBOTS: AN APPROACH USING SIMTWO. *Tiago P. Nascimento, António Paulo Moreira, Pedro Costa, Paulo Costa and André G. Scolari Conceição*

A CHARACTERIZATION OF HYSTERESIS SYSTEMS. *Fayçal Ikhouane*

A NOVEL LINEAR MILP MODEL TO SOLVE KAKURO PUZZLES. *José Barahona da Fonseca*

### Renewable and Efficient Energy Use (RE)

**Chair:** Rui Neves da Silva

**Room:** A2

DECISION SUPPORT SYSTEM FOR BUILDING RENOVATION. *Ana Rita Campos and Rui Neves-Silva*

MODEL PREDICTIVE CONTROL FOR THERMAL HOUSE COMFORT WITH LIMITED ENERGY RESOURCES. *F. A. Barata, J. M. Igreja and R. Neves-Silva*

MONITORING AND MANAGEMENT OF ENERGY IN PENTEADA BUILDING – A CASE STUDY. *Adriano Lopes, António Carvalho, Filipe Oliveira and Fernando Morgado-Dias*

RENEWABLE ENERGY CHARACTERIZATION OF MADEIRA ISLAND. *Sandy Rodrigues Abreu, Cristóvão Barreto and Fernando Morgado-Dias*



FUZZY CONTROL OF AN ELECTROLYZER IN A STAND-ALONE RENEWABLE ENERGY SYSTEM. *Isaías González Pérez, A. José Calderón Godoy and Manuel Calderón Godoy*

**16:00 - 16:30 Coffee Break**

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**16:30 - 18:30 Parallel Sessions**

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### **Control Applications 1 (CA1)**

**Chair:** Isabel Brás

**Room:** A1

NEUROMUSCULAR BLOCKADE CONTROL BASED ON SELF-OSCILLATING ADAPTIVE SYSTEMS. *Bertinho A. Costa and João M. Lemos*

KERNEL BEHAVIORS ON TIME SCALES. *Isabel Brás and Ewa Pawluszewicz*

PROGRAMMING EMBEDDED DEVICES IN IEC 61131-LANGUAGES WITH INDUSTRIAL PLC TOOLS USING PLCOPEN XML. *Markus Simros, Stefan Theurich and Martin Wollschlaeger*

ROBUST POLE-PLACEMENT CONTROL OF NEUROMUSCULAR BLOCKADE. *Daniela V. Caiado, João M. Lemos and Bertinho A. Costa*

ON THE STABILITY OF LINEAR FRACTIONAL DIFFERENCE SYSTEMS. *Paolo Vettori and Ricardo Pereira*

PORTUGUESE CONSORTIUM FOR ONLINE EXPERIMENTATION. *Maria Teresa Restivo and Alberto Cardoso*

### **Process Control (PC)**

**Chair:** Lemos Pinto

**Room:** A2

DESIGN AND IMPLEMENTATION OF CONTROLLED ATMOSPHERE CHAMBERS FOR CHERRY CONSERVATION. *José Boaventura Cunha, Paulo Moura Oliveira, E. J. Solteiro Pires and Jaime Cavalheiro*

POSCAST PID CONTROL OF OSCILLATORY SYSTEMS. *P. B. de Moura Oliveira, D. Vrančić and J. Boaventura Cunha*

APPLICATION AND ANALYSIS OF STICTION ESTIMATION METHODS TO CONTROL VALVES. *Matheus C. Hidalgo and Claudio Garcia*

EVALUATION AND OPTIMIZATION OF THREE-PHASE SEPARATOR VESSEL CONTROLLED BY PI CONTROLS APPLYING PARTICLE SWARM OPTIMIZATION. *André Felipe de Azevedo Dantas, Leandro Luttine da Silva Linhares, Jan Erik Mont Gomery Pinto, Fábio Meneghetti Ugulino de Araújo and André Laurindo Maitelli*

AUTOMATIC PILOT PLANT FACILITY DESIGNED FOR THE CONTROLLED AGEING OF MADEIRA WINES. *José C. Marques, Vanda Pereira, Ana C. Pereira, Mon-Chu Chen, Catarina Novo, Lúcia Bilro, Nélia Alberto, Paulo Antunes and João L. Pinto*

DYNAMIC MATRIX CONTROL OF THERMAL-OPTICAL LABORATORY SYSTEM. *Peter Guzmický and Štefan Kozák.*

**19:00 - 20:00 Welcome Cocktail @ Town Hall Honors Room**

## **TUESDAY, JULY 17th**

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**9:30 - 10:30 – Plenary session**

Distributed Control of Water Delivery Canals

**Prof. João Miranda Lemos**

**Room:** A1

*10:30 - 11:00 Coffee Break*

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**11:00 - 13:00 Parallel Sessions**

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### **Coordinated Control Water Delivery Canals (CCW) Invited Session**

**Chair:** Miranda Lemos, Ayala Botto, Rui Neves da Silva

**Room:** A1

MODULAR MODELING FOR LARGE SCALE CANAL NETWORKS. *João Lemos Nabais, João Lourenço and Miguel Ayala Botto*

SENSOR FAULT TOLERANT ARCHITECTURE FOR IRRIGATION CANALS. *João Lemos Nabais, L. F. Mendonça and Miguel Ayala Botto*

FAULT TOLERANT RECONFIGURABLE CONTROL OF A WATER DELIVERY CANAL - ACTUATOR FAULTS. *Inês Sampaio, João M. Lemos, Luís M. Rato and Manuel Riço*

AGENT-BASED DISTRIBUTED CONTROL OF A WATER DISTRIBUTION CANAL. *João Virote and Rui Neves-Silva*

PARAMETER TUNING OF A DISTRIBUTED MODEL PREDICTIVE CONTROLLER FOR WATER DELIVERY CANAL APPLICATION. *José M. Igreja, João M. Lemos, Filipe M. Cadete, Luis M. Rato and Manuel Riço*

ASSESSMENT OF DATA-DRIVEN MODELING STRATEGIES FOR WATER DELIVERY CANALS. *Isaias Tavares, José Borges, Mário Mendes and Miguel Ayala Botto*

## Wireless Applications (WA)

**Chair:** José Alberto Fonseca

**Room:** A2

DISTRIBUTED EVENT-BASED OBSERVERS FOR LTI NETWORKED SYSTEMS. *Pablo Millan, Ubaldo Tiberi, Carlo Fischione, Dimos V. Dimarogonas, Karl H. Johansson and Francisco R. Rubio*

WIRELESS MAGNETIC BASED SENSOR SYSTEM FOR ROAD TRAFFIC DATA COLLECTION. *F. Palhinha, D. Carona, A. Serrador and J. Lopes*

A MULTI-AGENT APPROACH FOR OUTLIER ACCOMMODATION IN WIRELESS SENSOR AND ACTUATOR NETWORKS. *Alberto Cardoso, Amâncio Santos, Gonçalo B. Nunes and Paulo Gil*

A HOSPITAL PATIENT LOCALISATION SYSTEM USING RF-SIGNAL RTT MEASUREMENTS. *Malte Schmidt, Ricardo Almeida, Helmut Dierker and José A. Fonseca*

COST-BASED OPTIMISATION OF THE ROUTING FOR WIRELESS SENSOR NETWORKS IN THE PRESENCE OF MOBILITY. *João M. Ferro and Fernando J. Velez*

WIRELESS VEHICULAR COMMUNICATIONS FOR AUTOMATIC INCIDENT DETECTION AND RECOVERY. *Joaquim Ferreira, José Fonseca and Jorge Lopes*

**13:00 - 14:00 Lunch Break**

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**14:00 - 15:00 – Plenary session**

Networked Control Systems: a Wireless Multirate Perspective

**Prof. Luis Rodrigues**

**Room:** A1

**15:00 - 15:20 Coffee Break**  
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**15:20 - 17:00 Parallel Sessions**  
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## Marine Control and Robotics (MCR)

**Chair:** A. Pedro Aguiar

**Room:** A1

A LINEAR DESIGN MODEL FOR WAVE FILTERING AND DYNAMIC POSITIONING. *Vahid Hassani, Asgeir J. Sørensen, António M. Pascoal and A. Pedro Aguiar*

OBSERVABILITY ANALYSIS OF THE SIMULTANEOUS UNDERWATER VEHICLE LOCALIZATION AND MAPPING BASED ON RANGING MEASUREMENTS. *Mohammadreza Bayat and A. Pedro Aguiar*

TRAJECTORY CONSTRAINTS FOR ROBUST VEHICLE FORMATION CONTROL. *Jorge Estrela da Silva, João Borges de Sousa and Fernando Lobo Pereira*

OBSTACLE AVOIDANCE IN OPTIMAL SWITCHING OF A FORMATION GEOMETRY. *Fernando A. C. C. Fontes, Dalila B. M. M. Fontes and Amélia C. D. Caldeira*

POSITION CONTROL FOR INDUCTION MOTORS USING THE SLIDING MODE CONTROL THEORY. *Oscar Barambones, Patxi Alkorta, José María Gonzalez de Durana and Jose Antonio Ramos*

## Control Applications 2 (CA2)

**Chair:** Marek Miskowicz

**Room:** A2

EXPERIMENTAL SETUP FOR TURBOCHARGER CONTROL. *João Paulo Coelho, Wojciech Giernecki, José Boaventura Cunha and Paulo de Moura Oliveira*

ASYMPTOTIC STABILITY OF LINEAR STOCHASTIC SYSTEMS WITH DELAY DRIVEN BY A BERNOULLI PROCESS. *Alessandro N. Vargas and João B. R. do Val*

KARNUMA AN EDUCATIONAL TOOL FOR DIGITAL SYSTEMS. *Valentim Freitas and Fernando Morgado-Dias*

A HYPERBOLIC TANGENT REPLACEMENT BY THIRD ORDER POLYNOMIAL APPROXIMATION. *Darío Baptista and Fernando Morgado-Dias*

EXTENSION OF REAL-TIME IMAGE VALIDITY BY EVENT-BASED UPDATES. *Marek Miśkiewicz and Dariusz Kościelnik*

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**17:00 - 18:00- APCA General Assembly (Members only)**

**Room:** A1

**19:30 Conference Dinner: São Tiago Fortress Restaurant**

## WEDNESDAY, JULY 18th

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**9:30 - 10:30 – Plenary session**

Real-Time Communications: from Fieldbuses and Industrial Automation to Wireless and Vehicular Applications

**Prof. José Alberto Fonseca**

**Room:** A1

*10:30 - 11:00 Coffee Break*

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**11:00 - 13:00 Parallel Sessions**

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**Neural Networks 2 (NN2)**

**Chair:** Antonio Moran Alvarez

**Room:** A1

TRACKING IN SCALE QUAD-ROTORS THROUGH ADAPTIVE AUGMENTATION. *Cesáreo Raimúndez and José Luis Camaño*

DUAL-PROCESSOR NEURAL NETWORK IMPLEMENTATION IN FPGA. *Diego Santos, Henrique Nunes, Fernando Morgado-Dias*

GENERATION OF ARTIFICIAL NEURAL NETWORKS MODELS IN ANTICANCER STUDY. *Inês J. Sousa, José M. Padrón and, Miguel X. Fernandes*

ON THE IMPLEMENTATION OF DIFFERENT HYPERBOLIC TANGENT SOLUTIONS IN FPGA. *Darío Baptista, Fernando Morgado-Dias*

VISUAL CONTINUOUS MAPS FOR ELECTRIC BILLS COMPARISON. *Antonio Morán, Juan J. Fuertes, Manuel Dominguez, Miguel A. Prada, Serafín Alonso and Pablo Barrientos*

COMPARING DIFFERENT IMPLEMENTATION FOR THE LEVENBERG-MARQUARDT ALGORITHM. *Darío Baptista, Fernando Morgado-Dias*

**Optimal Control (OC)**

**Chair:** José Jaime da Cruz

**Room:** A2

MULTI-PARAMETRIC CONSTRAINED OPTIMAL CONTROL OF A PNEUMATIC ARTIFICIAL MUSCLE. *George Andrikopoulos, George Nikolakopoulos, Ioannis Arvanitakis, and Stamatios Manesis*

A NONLINEAR MPC APPROACH TO MINIMIZE TOXICITY IN HIV-1 INFECTION MULTIDRUG THERAPY. *João M. Lemos, João V. Pinheiro and Susana Vinga*

SEMI-ACTIVE VISCOUS DAMPER FOR CONTROLLING CIVIL ENGINEERING STRUCTURES SUBJECTED TO EARTHQUAKES. *Fernando Oliveira, Miguel Ayala Botto, Afzal Suleman and Paulo Morais*

LYAPUNOV STABILITY CONSTRAINED ADAPTIVE NMPC FOR TUBULAR BIOREACTORS. *J. M. Igreja, J. M. Lemos and S. J. Costa*

MINIMUM-TIME MOTION PLANNING OF CRANES WITH PARAMETRIC UNCERTAINTY USING LINEAR PROGRAMMING. *Jose Da Cruz*

UNDERDETERMINED STOCHASTIC SYSTEMS MODELLED BY A CONTROL DEPENDENT DIFFUSION. *Rafael Fontes Souto and João Bosco Ribeiro do Val*

**15:00 - 18:00 Social Event: Cable Car + Monte Palace Tropical Gardens**

# Usefull Information

## **Participation identification**

Meeting badges are essential for admission to the Meeting venues and to the academic sessions and social events. Therefore we would like to ask that you to wear your badge at all times.

## **Coffee breaks**

Drinks will be served near the conference rooms, in the garden of the university building. Coffee, soft drinks and juices will be served.

## **Internet access**

Access to internet will be available via wireless network at the conference site. Please ask at the conference registration desk for instructions.

## **Bank and exchange**

Official opening hours of banks in Portugal vary. There are some exchange offices located at the Funchal city center. It is also possible to change foreign currency into Euro in many hotels, but with a higher transaction fee.

## **Electricity**

Electric sockets in Portugal carry 220V/50Hz and conform to the standard continental type. Travel adaptors may be useful for electric appliances with other standards and can be bought in many tourist shop in Funchal.

## **Pharmacies**

In Funchal pharmacies can be found all over the town. For overnight service there are always one or two pharmacies open in the city center. All pharmacies post signs directing you to the nearest open one.

All night service during the conference:

- . Farmácia Honorato, Rua da Carreira, 62, (+351 291203880), July 16
- . Botica Inglesa, Rua Câmara Pestana, 23-25, (+351 291203060), July 17
- . Farmácia Avenida, Rua do Aljube, 51-55, (+351 291201850), July 18

# Social Program

## City Hall of Funchal

The first settlers arrived in Madeira between 1420 and 1425. Under the leadership of the 1st captain of Funchal, João Gonçalves Zarco, the first inhabitants soon had to organize themselves and set up a municipal centre, which later on, around 1453, would be elevated to Village, by King D. Afonso V charter.

The old municipal installation of the 15th century, in time, was no longer suitable for the needs of a city such as Funchal. Thus, the seat of city government moved from one building to another and in the first half of the 19th century, it came to be installed in the palace where it still operates today.



The Carvalho Esmeraldo Palace was built by Francisco Antonio da Câmara Leme in 1758, who recuperated previous constructions. It subsequently passed through the hands of various owners and tenants, and in the beginning of the 19th century, the owner was D. Joana Teresa, daughter of Joana de Carvalho and her husband, the sergeant-at-arms of Funchal, Francisco Roque de

Albuquerque Figueiroa. A short time later, Funchal City Council was installed in the building, which was acquired in 1883.

In 1940, under the mayoralty of Dr. Fernão de Ornelas, the building and its surroundings were extensively remodeled, resulting in the building as we know it today, which faces a large square dominated by a fountain, the overall project being the responsibility of the architects Raúl Lino and Carlos Ramos.

From: <http://www1.cm-funchal.pt/en/>

## Monte Palace Tropical Garden

On 12 November 1988 the José Berardo Foundation was set up and José Berardo donated the Monte Palace to this Institution. Thus the conditions were created to summon up the energy and the means needed to ensure the full recuperation of the buildings and garden, which had lain abandoned since 1945.

José Berardo and his wife Carolina dedicated themselves personally to this great effort. They were helped in the recuperation work on both a professional



and friendly level by José Manuel Carvalho in the renovation of the buildings, by Mário Rodrigues in the redecoration of the interiors and by José Eleutério Ascensão Soares in the reorganization of the gardens.

Through the Foundation, José Berardo chose to adorn the Tropical Garden with square stone masonry, selected works of art, Koi fish and exotic birds. For those who wish to wander along its walkways and within its caves and to enjoy these features, the idea of the Tropical Garden, in line with the botanical gardens which were so in vogue in the 19th century, allows them to dream or at least be free to dream about other worlds.

If aesthetic concerns were predominant, concerns for the protection of the environment and species also made their mark. The new garden is a nursery which gracefully supplies visitors with plants and allows for the scientific study of nature, above all for children and young adults. The flora species native to Madeira, plants originating from Asia, azaleas from Belgium, heathers from Scotland and especially, a unique collection of cycads from South Africa have all been brought together in the creation of the new garden.

It was the culmination of all this work that José Berardo presented to the public on 5th of October 1991, with a reception for the people and the President of Madeira and the Bishop of Funchal.

The Berardo Foundation will ensure that this garden does not return to the state of abandonment in which José Berardo found it.

From: <http://www.montepalace.com>

## São Tiago Fortress



As the Portuguese almost completely dominated the North Atlantic routes at those times, the defence of the island did not seem of special importance. Because of this negligence, in 1566 Funchal suffered a terrible pirate attack, where many people were slaughtered.

In spite of the constant danger of another attack, only in 1614 the Santiago Fort was finally built to protect Funchal from the corsairs. In 1767 it was enlarged and exclusively served military purposes until 1992, year in which Madeira's Regional Government decided to use it for cultural activities.

Today this fortress accommodates a museum, a permanent as well as temporary expositions and an excellent restaurant with a terrace in a prime location. Under the cover of the Contemporary Art Museum, varied cultural activities take place throughout the year.

From: <http://www.madeira-web.com/PagesP/funchal-nucleus/santa-maria/santiago-fortress.html>



Monte Palace  
Tropical Gardens



Conference location



City Hall



Cable Car



São Tiago Fortress





# CONTROLO'2012



## Organization



## Sponsors

