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# International Federation of Automatic Control

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# Newsletter

## The IFAC General Assembly Meets

Prague, Czech Republic, 4 July, 2005

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Prague, CZ, 4 July 2005

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July 4, 2005 was the day on which the General Assembly met for its triennial meeting in the framework of the IFAC World Congress in Prague.

35 out of 49 National Member Organizations (NMOs) were present with their delegations at the General Assembly Meeting

During the meeting, the IFAC President, Vladimír Kucera, the Technical Board Chair (Vice-President), Michael K. Masten and the Executive Board Chair (Vice-President), Peter Fleming reported on the past triennial period.

In his address to the General Assembly, the President listed the priorities he had had during the triennium: Disseminating best practices, attracting new disciplines, defining emerging areas, interacting with industry, cooperating with other international organizations, furthering the use of telecommunication systems and hosting an excellent Congress. In conclusion of his report, the President thanked all the persons and boards that had contributed towards making his Presidency a success. He was proud to have been able to serve IFAC, and wished the new team a prosperous future.

The Technical Board Chair then gave an overview of the activities of the past triennium: Since the Congress in Barcelona, IFAC has been involved in altogether 85 events. More than 10.000 persons have attended. IFAC has sponsored- or co-sponsored events. The 62 IFAC events were hosted by a total of 32 different NMOs. Already now, 38 events have been approved for the forthcoming triennium and many more are currently in preparation.

Interaction with NMOs is very good. In addition to hosting IFAC events, NMOs propose members to Technical Committees and identify potential Technical Committee and Coordinating Committee Chairs.

All TCs now have their own homepage. All nine CCs have prepared a Milestone Report each which were highlight features at the Congress and will also be published in the IFAC Journal "Annual Reviews in Control". Thus all areas of activity of IFAC are well covered. But in addition, new areas of activity are always sought. During the IFAC Council- and Related Meetings in Rotterdam in 2003 an emerging areas session was held to identify new areas of activities important for IFAC. The results of this activity were published in the IFAC Newsletter and on the web.

The Executive Board Chair highlighted the activities of the various Executive Committees over the Triennium. A great number of changes are currently taking place in the publications sector,

with the transition to purely electronic forms of event publications underway. At the moment, Elsevier, the IFAC publisher, still prints proceedings of Symposia, Conferences and the Congress in paper format. At some point in the future, however, papers given at IFAC events will be available electronically at cost on everybody's desktop. This should contribute towards a better dissemination of meeting material.

The Executive Board Chair then forecast several activities, which are planned to take place in the forthcoming triennium. They include IFAC's 50th anniversary in 2006, which will be celebrated by a meeting in Heidelberg, next September, in conjunction with the IFAC Symposium on Mechatronics in Wiesloch. Heidelberg was the place, where IFAC's foundation was conceived in 1956, with the actual founding contract being signed in Paris in 1957. More projects are planned around the meeting in Heidelberg, dealing with the past, the present and the future of automatic control. Further activities are the establishment of an IFAC Foundation, which had previously been approved by the General Assembly.

In addition to the reports by the President, and the two Vice-Presidents, the Treasurer provided information on IFAC's finances, and the Secretary, Gusztav Hencsey addressed the meeting, informing the NMOs of his retirement from the position of Secretary after 21 years of service. Gusztav Hencsey stated that this Congress was the 7<sup>th</sup> and the last one he was attending as IFAC Secretary. IFAC had been a highlight in his life. It had been a great pleasure to work with outstanding personalities who are at the same time friends. He stressed the importance to a functioning and stable Secretariat, and the readiness of people and NMOs to work for the Federation.

He then introduced the incoming Secretary, Kurt Schlacher from Austria. In conclusion of his address he thanked all persons he had had the pleasure to work with and stressed that he would continue to make his services available to IFAC in the position of IFAC Advisor and member of the Policy Committee.

The Secretary's address was met with applause and the President then thanked Gusztav Hencsey on his own behalf and on behalf of the entire Federation for many years of dedicated service.

Then followed the election of the IFAC Officers and the Ordinary Council Members by the General Assembly. The following persons were unanimously elected:

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## IFAC Officers:

President	Wook Hyun Kwon (Korea)
President Elect	Alberto Isidori (Italy)
Vice President (TB)	Sirkka-Liisa Jämsä-Jounela (Finland)
Vice President (EB)	Peter Fleming (United Kingdom)
Immediate Past President	Vladimir Kucera (Czech Republic)
Treasurer	Lino Guzzella (Switzerland)

## Ordinary Members:

Luis Basanez	(Spain)
Ian Craig	(South Africa)
Carlos E. De Souza	(Brazil)
A. Talha Dinibütün	(Turkey)
Jean Michel Dion	(France)
Rob Evans	(Australia)
Lei Guo	(China, P.R.)
Abraham Haddad	(USA)
Rolf Isermann	(Germany)
Hidenori Kimura	(Japan)
Alexander B. Kurzanski	(Russia)
Marek B. Zaremba	(Canada)

W.H. Kwon thanked the NMO representatives for electing him as President of IFAC. He stated, that he was the 3rd President from Asia after Japan and China. He considered it one of his major tasks to continue the very fruitful cooperation with the NMOs. He would also try to strengthen and improve this service.

In the forthcoming Newsletters, we shall provide more information on the various projects and activities of IFAC, as well as give comprehensive information about the World Congress in Prague.

## Dear Newsletter Readers,

Let me use the form of a letter to address you all directly.

For 21 years I have been editor of this Newsletter and Secretary of IFAC. So I may very well say that IFAC has been a very big part of my professional and personal life. And it has been a very good part as well. I was able to witness the development of the International Federation of Automatic Control, its growth into a worldwide organization that caters to the needs of the automatic control community.

## Summer School on Control, Computing and Communication 2005 Prague Technical University 27 June - 1 July, 2005

The Department of Control Engineering at the Faculty of Electrical Engineering of the Czech Technical University in Prague organized the IFAC Summer School on Control, Computing and Communication, which was held in Prague during the five days preceding the 16th IFAC World Congress. The School was also financially supported through one of the special projects of IFAC.

The objective of the school was to provide an overview over the main principles and technologies for supporting the development of embedded control systems.

The school was aimed at graduate students, PhD students and engineers with some background in control engineering, computer science and real-time communications. No specific knowledge was required to understand the course, since all new concepts were explained and illustrated with concrete examples.

In all these years also the Newsletter has gone through various phases of development. Being practically "handmade" at the beginning, bringing information with quite some delay, the Newsletter is now produced electronically and publishes reports on events, information on technical activities very soon after they have happened. So we have practically arrived in the age of real-time publishing. Today, the Newsletter is on the web, on the IFAC Homepage right after publication. Still, we also provide the Newsletter to you also in the traditional printed version, to allow you to have it ready on your desks to show to visitors, friends and colleagues.


In these 21 years I have also accompanied the Secretariat in Laxenburg, with Barbara Aumann, Elfriede Schrott, who was succeeded by Ernestine Rudas after one year of my service, and Elisabeth Löschinger, who retired only a year ago by my side. Together we have developed the Secretariat into a service and communication centre for the Federation. The last years were used to successfully usher in the electronic age – a process which is still ongoing and will most probably never stop.

After 21 years the time has come for me to retire from my position as Secretary and thus as Editor of the IFAC Newsletter. The transition has been well prepared and a successor has been found in the person of Kurt Schlacher. On the occasion of the IFAC World Congress in Prague, Kurt Schlacher was elected to the office of IFAC Secretary. He will be supported by Barbara Aumann and Ernestine Rudas just as I was in all my years of service.

I shall continue to serve IFAC in other functions. I am very proud that now Past President, Vladimir Kucera, has appointed me to the position of Lifetime Advisor of IFAC. Further I shall use my experience in the Federation as a member of the Policy Committee.

Let me use the vehicle of this Newsletter to wish my successor the best of success.

And I would like to thank all of you for helping to develop the International Federation of Automatic Control into a successful organization for control engineers worldwide.



Gábor Hencsey

Gábor Hencsey

A total of 63 persons attended the school, approximately half of these being from the Czech Republic. All activities developed in the course were supported by documents prepared by the lecturers. The presentations were given to all participants and are also available on the summer school web page at <http://dce.felk.cvut.cz/hanzalek/ifacss05>

In this Newsletter we shall give an overview over the Program that the school offered to the students. In one of the next issues, we shall give an inside look by one of the students who will tell us about the experience with this form of disseminating the knowledge about control engineering.

Before the courses started, Prof. Vladimir Kucera, IFAC President, gave a welcome address:

The school was divided in 5 courses, one per day, of 6 hours each.

## Analysis and Control of Temporal Behavior in Distributed Embedded Systems (Tarek Abdelzaher, University of Virginia, USA)

Software systems are becoming larger and more complex. At the same time, they are being deployed in applications where performance assurances are increasingly important. Traditional approaches for providing such assurances that rely on a priori knowledge and detailed models are not effective for a large class of software systems. This tutorial described recent advances in software performance control that leverage two theoretical foundations. The first foundation lies in the development of new utilization-based schedulability analysis techniques that apply to aperiodic task systems and allow quantifying the ability of such systems to meet end-to-end timing constraints. The second lies in the application of control theory in the field of performance control in complex software applications such as web servers, multimedia control, storage centers, power control in CPUs, and sensor networks. In this tutorial, we illustrated the computation of feasible regions that describe the real-time capacity limits of software. Within those limits, we demonstrated the formulation of software performance assurance problems as those of feedback control. We described modeling the software system by difference equations, presented a taxonomy of software control problems, and provided examples of performance control in contemporary servers. We concluded with important challenges that face the application of control and schedulability analysis techniques to future performance assurance problems in distributed software systems.

## Real-time Networks for Embedded Systems: a Focus on Operational Flexibility (Luis Almeida, University of Aveiro, Portugal)

Technological advances in hardware made possible the embedding of both processing and communication functions in highly integrated, low-cost components. This high availability of these components fostered the use of a distributed approach in many application fields, from process control to factory automation, embedded systems, office automation, etc. Some applications in these domains present hard real-time constraints, having a strong impact on human lives either directly, e.g. transportation systems, as well as indirectly, e.g. highly automated factories or crucial processes (energy supply, chemicals, ...). In these application domains, an underlying computer network is used to support the exchange of process data among several computing nodes that cooperate to achieve control over the environment in a desired way. For the control to be predictable, either monitoring as well as actuation must be subject to precise time constraints. These, in turn, are reflected not only on the computations performed on the computing nodes, but also on the information transfer over the network. Following the concept of encapsulating different functionality in separate intelligent nodes (e.g. intelligent sensors and actuators), the number of nodes in distributed real-time systems kept increasing, leading to higher connectivity and scalability requirements. However, it also resulted in higher system complexity, even with simpler individual nodes, and led to a stronger impact of the network on the global system properties. The network, or generally the communication system, determines, to a great extent, the support for properties such as composability, timeliness, flexibility and dependability as well as determines the efficiency in the use of system resources. In particular, this latter topic is gaining more interest

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given its potential to reduce costs, either design or deployment, but it implies a high level of operational flexibility necessary to support adaptation to instantaneous resource requirements. This course presented an introduction to computer networks from a real-time systems perspective, only. It aimed at:

- 1) Transmitting the concept of network in a distributed real-time system as an independent component i.e. the communication system
- 2) Analyzing existing technologies, techniques and protocols to support timeliness in the communication system
- 3) Establishing a relationship between those technical solutions and the system macroscopic properties
- 4) Analyzing the particular case of operational flexibility and its interplay with other properties, such as efficiency, timeliness and safety.

The course layout included an initial presentation of general concepts in networks and then focused on the physical and data link layers, devoting particular attention to the medium access control. Then, the course addressed the issue of traffic scheduling and its relationship with medium access control, showing typical schedulability analysis that can be used to derive a priori guarantees of traffic timeliness. Four paradigmatic protocols were then presented and analysed, WorldFIP, TTP/C, CAN and Ethernet. Finally, the course analysed the impact that the options taken at the data link level have on the macroscopic network behaviour and concluded presenting some trends in this field concerning the introduction of higher operational flexibility for efficient resource usage, without relinquishing timeliness and safety.

#### **Real-Time Ethernet: Standards and PROFINET (Max Felsler, Berne University of Applied Science, Switzerland)**

After more than ten years of experience with applications of fieldbus in automation technology, the industry starts to develop and adopt Real-Time Ethernet (RTE) solutions. There already exist now more than ten proposed

solutions. IEC standards are trying to give a guideline and selection criteria based on recognized indicators for the user. One of the RTE solutions is PROFINET proposed by the PROFIBUS International organization. PROFINET is already now available in different technologies like Component Based Automation (PROFINET CBA) and Input/Output (PROFINET IO) oriented structures. The different requirements of the automation applications are fulfilled with different existing protocols like DCOM, RPC, HTTP etc. To reach the requirements of Real-Time also for Motion-Control applications new protocol and Ethernet-Switching technology had to be defined. This lecture gave a short overview of the proposed RTE standards and the PROFINET system architecture. Examples of PROFINET CBA were explained. The new Ethernet protocols for Real-Time (RT) and Isochronous Real-Time (IRT) developed for PROFINET were explained and as far as possible also demonstrated on industrial products.

#### **Real-Time Safety-Critical Systems: Fundamental Concepts, Design Principles, and Software Development (Andrew J. Kornecki, Embry-Riddle Aeronautical University, USA)**

The objective of this lecture was to provide practical guidelines on software development and analysis techniques for control engineers engaged in designing software-intensive, real-time, safety-critical systems. Software is the critical component of all industrial, military, and commercial systems. For most of software intensive real-time applications in military, aerospace, aviation, nuclear and medical systems, safety and reliability are essential, thus related time criticality and determinism are of an equal importance. Real-time software interacts with the environment and must meet specific timing and safety criteria. The development of such systems requires skills and knowledge often exceeding the standards offered by colleges and universities in many computer science, computer engineering and control engineering programs. This full-day lecture addressed selected practical aspects of real-time safety-critical software development. The lecture was structured in a top-down manner and included the following modules:

- a) basic real-time terminology and safety-critical concepts;
- b) designing software for safety;
- c) programming language issues related to timeliness and safety;

d) real-time kernels and low-level programming, and

e) selected issues of designing computer interconnects and databases.

The individual topics included: development lifecycle, real-time and safety-critical architectures, real-time programming, task structuring, selection of appropriate operating system, elements of scheduling analysis, and analysis of computer buses. The lecture was designed to give the control and system engineers an additional perspective on the software component of a typical real-life system with timing constraints and safety implications. It emphasized the lessons learned and pitfalls of real-time software development and included views on the current state of practice in real-time safety-critical software based on instructors' experiences with developing software products for aviation, nuclear, and medical industries.

#### **Quality of Service in Real-time Distributed Systems and Process Control Applications (Guy Juanolet (LAAS, CNRS Toulouse, France)**

This lecture was oriented on the problems of the implementation of industrial applications and more precisely process control applications (i.e. which have a closed loop structure) on distributed systems (computers connected through a communication network) which must be real time in order to guarantee the performances of these applications (stability in particular). The quality of the service provided by the distributed system depends particularly on the exchanges of the messages between remote tasks (scheduling of the messages through the transmission resource, data transfer) and on the scheduling of the tasks in the computers. The design of such systems must be based on an integrated view which must operate at the distributed system level (computer and communication science view) and at the process control application level (automatic control view). It is a pluridisciplinary work and the goal of this lecture was to show it. The following points were emphasized (Mechanisms of real time local area networks (like FIP, CAN, ARINC 629 CP) and Data transfer, Evaluation of the Quality of Service(QoS) using Petri-nets based models, Influence of this QoS on the stability of a closed loop Process Control application, Linking Process Control parameters to Network parameters

## **Industry Days** **During the 16th IFAC World Congress in Prague, CZ** **July 5 - 6, 2005**

Promoting industry participation at the 16th IFAC Congress was one of the key efforts made by the International Program Committee and sub-Committee members when preparing the program. IPC and sub-IPC members having links to partners from industry contacted leading manufacturers of automation technology, including manufacturers of hardware, software and solutions, R&D companies specialized in certain fields of automation and end users of this technology. The applied areas, where our effort was successful, are automotive industry, transportation and process control, namely control of chemical processes including steel manufacturing, pulp & paper and mineral processing.

We contacted primarily the companies conducting basic and applied research in cooperation with universities and academia. These projects are not necessarily company confidential and represent

rather long term interests. Industrial partners were either willing to present their achievements or alternatively gave rights to the academic partners to write the paper on their behalf. Coordinators of specific European Frameworks projects were asked to cooperate, when assembling the industry-oriented sessions, as topics they treat have high innovative grade and are not confident. In addition, these projects represent a long-term research and development, which is of an interest to Congress participants.

We offered industry to participate in the following congress activities:

- Plenary papers with industrial relevance from industrial authors
- Case study papers (double length) as success stories
- Invited sessions with successful applications
- Survey papers on emerging areas

- Panel discussions on up-to-date topics with industrial participation
- Exhibition
- Sponsorship

An effort was made to get:

Survey papers presenting state of the art in the selected area focusing on well established and proven (control, simulation, optimization, ...) techniques sending a message to academics which area does not urgently need further research.

Presentation of open and practically important problems having no good solution yet was particularly welcome. The report was expected from end-users of automation rather than from manufacturers and solution providers. There are companies looking for this opportunity to express their needs as they believe that no existing solutions satisfy their requirements.

## Awards at the Opening Ceremony of the 16th IFAC World Congress Prague, Czech Republic, 4 - 8 July 2005

At the Opening Ceremony of the Congress on July 4, 2005, several awards were presented.

### IFAC Advisors

As is stipulated in the IFAC Constitution, the President has the right to appoint Lifetime Advisors to IFAC. At this Congress, he had the pleasure to appoint the following outstanding personalities to this function:

**Pedro Albertos**  
(President of IFAC 1999 – 2002)



**Gusztáv Hencsey**  
(Secretary of IFAC 1984 – 2005)



**Michael Masten**  
Vice-President of IFAC, Technical Board 2002 – 2005)



### IFAC Fellows

The IFAC Fellow award was introduced in 2004, provides a distinction of excellence in the Federation and is conferred by the IFAC Council based on the proposal of a Fellow Selection Committee (FSC). Being awarded for the first time, all Advisors and all previous winners of the Quazza and/or Nichols Medal were appointed. In addition, several further outstanding personalities had been nominated and selected to receive the Fellow Award. Below find a list of persons who received the Fellow Pin and a Certificate in a brief ceremony following the actual opening ceremony of the Congress

Jürgen **Ackermann**, Brian D.O. **Anderson**, Karl J. **Aström**, Mituhiko **Araki**, Tamer **Basar**, Luis **Basanez**, Jiri **Benes**, Jacques **Bernussou**, Robert **Bitmead**, Edward J. **Davison**, János **Gertler**, Graham **Goodwin**, Rolf **Isermann**, Alberto **Isidori**, Stephen **Kahne**, Petar **Kokotovic**, Huibert **Kwakernaak**, Lennart **Ljung**, Mohamed **Mansour**, Carl **Nett**, Antti **Niemi**, William F. **Powers**, Juan A. de la **Puente**, Yoshikazu **Sawaragi**, Walter **Schaufelberger**, Gunter **Stein**, Manfred **Thoma**, Tibor **Vámos**, Paavo **Uronen**, Xiong **Fan Lun**

### Harold Chestnut Control Engineering Textbook Prize

This Award was also presented at the Opening Ceremony of the IFAC Congress. As already announced in the Number 3 Issue of the IFAC Newsletter, it went to the Textbook "Control Systems Design", published by Prentice Hall in 2001 and co-authored by **Graham C. Goodwin, Stefan Graebe and Mario E. Salgado**.

### Journal Prizes

Prizes are also awarded for the best papers published in the IFAC Journals Automatica, Control Engineering Practice, Engineering Applications of Automatic Control and the Journal of Process Control. The prize-winning papers were

#### Automatica

Time Delay Systems: An overview of some recent advances and open problems, by **J.P. Richard** (Survey).  
Citation: This paper presents a comprehensive and tutorial survey of recent advances and open problems in time delay systems.

Switching Between Stabilizing Controllers, by **J.P. Hespanha** and **A.S. Morse** (Theory).  
Citation: This paper presents pioneering work on the assurance of stability when switching between stabilizing controllers designed for a complex system.

Implicit Fault-tolerant Control: Application to Induction Motors, by **C. Bonivento, A. Isidori, L. Marconi and A. Paoli** (Applications).  
Citation: This paper presents an innovative way of designing fault-tolerant control and its application to induction motors.

#### Control Engineering Practice

Run-to-run control and performance monitoring of overlay in semiconductor manufacturing, by **C. A. Bode, B. S. Ko, and T. F. Edgar**  
Citation: For a successful implementation of linear model predictive control giving significantly improved performance in a run-to-run semiconductor process

An automated gantry crane as a large workspace robot, by **Oliver Sawodny, Harald Aschemann, and Stephan Lahres**  
Citation: For the innovative implementation and application for an automated gantry crane using robotics theory

A survey of industrial model predictive control technology, by **S. Joe Qin and Thomas A. Badgwell**  
Citation: For an excellent survey and unification of different methods and applications of model predictive control theory

#### Journal of Process Control

Selecting nonlinear model structures for computer control., by **R. K. Pearson** (Survey)  
Detection of multiple oscillations in control loops, by **N. F. Thornhill, Biao Huang, H. Zhang** (Methodology / Theory)  
Control of an industrial polymerization reactor using flatness, by **N. Petit, P. Rouchon, J.-M. Boueilh, F. Guérin, P. Pinvidic** (Application)

#### Engineering Applications of Artificial Intelligence

Immunity-based hybrid learning methods for approximator structure and parameter adjustment, by **Yixin Diao and Kevin M. Passino** (Theory)

Application of signed digraphs-based analysis for fault diagnosis of chemical process flowsheets, by **Mano Ram Maurya, Raghunathan Rengaswamy and Venkat Venkatasubramanian** (Application)

Optimization of physical flows in an automotive manufacturing plant: some experiments and issues, by **E. Muhl, P. Charpentier and F. Chaxel** (Applications)

**A report on the Awards Finalists and Prize Winners of the IFAC Congress Applications Paper Prize, the IFAC Congress Young Author Prize, the IFAC Congress Best Poster Prize and the Best Exhibited Product Prize, all presented at the Closing Ceremony of the IFAC World Congress, will be published in the next issue of the IFAC Newsletter**

The Tables of Contents of the IFAC Journals can be found respectively at

#### Automatica

<http://www.elsevier.com/locate/automatica>

#### Control Engineering Practice

<http://www.elsevier.com/locate/conengprac>

#### Engineering Applications of Artificial Intelligence

<http://www.elsevier.com/locate/engappai>

#### Journal of Process Control

<http://www.elsevier.com/locate/jprocont>

#### Annual Reviews in Control

<http://www.elsevier.com/locate/arcontrol>

#### Mechatronics

[http://www.elsevier.com/wps/find/journaldescription.cws\\_home/933/description](http://www.elsevier.com/wps/find/journaldescription.cws_home/933/description)

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## FORTHCOMING EVENTS

2005  
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Title	2005	Place	Further Information
CACHE/IFAC Conference Foundation of Systems Biology in Engg. - FOSBE2005	August 7 – 10	St.Barbara, CA USA	<a href="http://www.fosbe.org">http://www.fosbe.org</a> e-mail: craven@fosbe.org
ICINCO/IFAC Conference (2 <sup>nd</sup> ) Informatics in Control, Automation and Robotics	September 14 – 17	Barcelona Spain	<a href="http://www.icinco.org">http://www.icinco.org</a> secretariat@icinco.org
EWICS Intl. Conference 24 <sup>th</sup> Computer Safety, Reliability and Security – SAFECOMP2005	September 28 – 30	Fredrikstad Norway	<a href="http://www.safecomp.org">http://www.safecomp.org</a> e-mail: safecomp2005@hrp.no
IFAC Conference Fieldbus Systems and their Applications – FeT2005	November 14 – 15	Puebla Mexico	<a href="http://www.fet2005.cs.buap.mx">http://www.fet2005.cs.buap.mx</a> e-mail: fet2005@cs.buap.mx
IFAC Workshop Advanced Process Control for Semi- Conductor Manufacturing	December 4 – 5	Singapore	<a href="http://">http://</a> to be announced e-mail : elehowk@nus.edu.sg
Title	2006	Place	Further Information
IFAC Symposium Mathematical Modelling – 5 <sup>th</sup> MATHMOD	February 08 – 10	Vienna Austria	<a href="http://www.mathmod.at">http://www.mathmod.at</a> email: inge.troch@tuwien.ac.at
IFAC Workshop Programmable Devices and Embedded Systems - PDeS	February 14 – 16	Brno Czech Rep.	<a href="http://www.pdes2006.feec.vutbr.cz">http://www.pdes2006.feec.vutbr.cz</a> e-mail: pdes2006@feec.vutbr.cz
IFAC Workshop Control Applications in Post-Harvest and Processing Technology CAPPT 2006	March 26 – 29	Potsdam Germany	<a href="http://CAPPT2006.atb-potsdam.de">http://CAPPT2006.atb-potsdam.de</a> e-mail: cappt2006@atb-potsdam.de
IFAC Symposium System Identification – SYSID 2006	March 29 - 31	Newcastle Australia	<a href="http://sysid2006.org">http://sysid2006.org</a> e-mail: secretariat@sysid2006.org
IFAC Symoisum Advanced Control of Chemical Proceses -ADCHEM 2006	April 2 – 5	Gramado Brazil	<a href="http://www.adchem.org">http://www.adchem.org</a> e-mail: adchem@enq.ufrgs.br
IFAC Workshop Control Applications of Optimization	April 26 – 28	Cachan-Paris France	<a href="http:www.ens-cachan.fr/cao06">http:www.ens-cachan.fr/cao06</a> e-mail: to be announced
IFAC Symposium Information Control Problems in Manu- facturing – INCOM 2006	May 17 – 19	St. Etienne France	<a href="http://www.emse.fr/incom.fr">http://www.emse.fr/incom.fr</a> e-mail: incom06@emse.fr
IFAC Symposium Automated Systems Based on Human Skill and Knowledge	May 22 – 24	Nancy France	<a href="http://www.ensgsi.inpl-nancy.fr/ASBoHS06/">http://www.ensgsi.inpl-nancy.fr/ASBoHS06/</a> e-mail: Laure.Morel@ensgsi.inpl-nancy.fr
IFAC Conference 6 <sup>th</sup> Analysis and Design of Hybrid Systems ADHS'06	June 07 – 09	Alghero Italy	<a href="http://www.diee.unica.it/adhs06/">http://www.diee.unica.it/adhs06/</a> e-mail: adhs06@diee.unica.it
2006 American Control Conference - in cooperation with IFAC -	June 14 – 16	Minneapolis MN, USA	<a href="http://www.a2c2.org/conferences/acc2006/">http://www.a2c2.org/conferences/acc2006/</a> e-mail: misawa@ceat.okstate.edu
IFAC Conference Improving Stability in Developing Nations through Automation - ISA'06	June 15 – 17	Prishtina Serbia Montenegro Kosovo	<a href="http://www.ihrt.tuwien.ac.at/swiis2006/">http://www.ihrt.tuwien.ac.at/swiis2006/</a> e-mail: to be announced
IFAC Symposium 7 <sup>th</sup> Advances in Control Education –ACE 06	June 21 – 23	Madrid Spain	<a href="http://www.dia.uned.es/ace2006/index.html">http://www.dia.uned.es/ace2006/index.html</a> e-mail: ace2006@dia.uned.es
IFAC/IEEE Symposium Power Plant and Power System Control	June 25 – 28	Kananaskis/Alberta Canada	<a href="http://ifacpps2006.org/">http://ifacpps2006.org/</a> e-mail: ifacPPS2006@ucalgary.ca
IFACConferences Analysis and Control of Chaotic Systems	June 28 – 30	Reims France	<a href="http://www.univ-reims.fr/chaos06">http://www.univ-reims.fr/chaos06</a> e-mail: chaos06@univ-reims.fr
IFAC Symposium 5 <sup>th</sup> Robust Control – ROCOND	July 05 – 07	Toulouse France	<a href="http://www.laas.fr/rocond06">http://www.laas.fr/rocond06</a> e-mail: rocond06@laas.fr
Asian Control Conference - in cooperation with IFAC	July 18 – 21	Bali Indonesia	<a href="http://www.ascc2006.com">http://www.ascc2006.com</a> e-mail: secretariat@ascc2006.com

## FORTHCOMING EVENTS (ctd.)

IFAC Workshop Lagrangian and Hamiltonian Methods for Nonlinear Control	July 19 – 21	Nagoya Japan	http:// to be announced e-mail: to be announced
IFAC Workshop Fractional Differentiation and its Applications	July 19 – 21	Porto Portugal	http://www.gecad.isep.ipp.pt/FDA06 e-mail: fda06@dee.isep.ipp.pt
IFAC Symposium Fault Detection, Supervision and Safety of Technical Processes – SAFEPROCESS	August 30 - September 1	Beijing China	http://www.au.tsinghua.edu.cn/safe/safeprocess2006/ e-mail: safeprocess2006@mail.tsinghua.edu.cn
IFAC Symposium 8 <sup>th</sup> Robot Control – SYROCO	September 6 - 8	Bologna Italy	http://www-lar.deis.unibo.it/syroco2006/ e-mail: cmelchiorri@deis.unibo.it
IFAC Symposium Mechatronics Systems	September 12 – 14	Wiesloch Germany	http://www.mechatronics2006.com e-mail: ringelmann@vdi.de
<b>IFAC 50<sup>th</sup> Anniversary Celebration Present and Future of Automatic Control</b>	<b>September 15</b>	<b>Heidelberg Germany</b>	
IFAC Symposium 6 <sup>th</sup> Modelling and Control of Biomedical Systems	September 20 – 22	Reims France	http://www.univ-reims.fr/mcbms06 e-mail: mcbms06@univ-reims.fr
IFAC Workshop Automation in Mining, Mineral and Metal Processing	September 20 – 22	Cracow Poland	http://konferencje.polsl.pl/IFAC2006 e-mail: IFAC2006@polsl.pl
IFAC Conference Management and Control of Producton and Logistics – MCPL'2007	September 27 – 30	Sibiu Romania	http:// to be announced e-mail: to be announced
IFAC Workshop Energy Saving Control in Plants and Buildings	October 2 – 10	Bansko Bulgaria	http://IFAC_ESC.tu-sofia.bg e-mail: to be announced
IFAC Workshop Nonlinear Model Predictive Control for Fast Systems (NMPC_FS'06)	October 9 – 11	Grenoble France	http:// www.lag.ensieg.inpg.fr/NMPC_FS06/ e-mail: NMPC_FS@lag.ensieg.inpg.fr
<b>Title</b>	<b>2007</b>	<b>Place</b>	<b>Further Information</b>
IFAC Symposium Computer Applications in Biotechnology - CAB-10	June 4 – 6	Cancun Mexico	www.lingen.unam.mx/CAB-10 e-mail: to be announced
IFAC Symposium Dynamics and Control of Process Systsems - DYCOPS-8	June 6 – 8	Cancun Mexio	http://www.lingen.unam.mx/DYCOPS-8 e-mail: to be announced
IFAC Symposium Automatic Control in Aerospace	June to be announced	Toulouse France	http:// to be announced e-mail: to be announced
2007 American Control Conference - in cooperation with IFAC -	July 11 – 13	New York NY, USA	http://www.a2c2.org/conferences/acc2007/ Email: judd@ohio.edu
IFAC Symposium 12 <sup>th</sup> Automation in Mining, Mineral and Metal Processing - MMM	August 21 – 24	Quebec City Canada	http://www.gch.ulaval.ca/ifacmmm07/ e-mail: ifacmmm07@gel.ulaval.ca
IFAC Symposium Nonlinear Control Systems	August 22 – 24	Pretoria South Africa	http:// www.nolcos2007.org.za e-mail: noc@nolcos2007.org.za
IFAC Symposium System Structure and Control - SSSC 2007	October 17 – 19	Iguacu Brazil	http://www.sssc07.br e-mail: to be announced
<b>Title</b>	<b>2008</b>	<b>Place</b>	<b>Further Information</b>
American Control Conference - in cooperation with IFAC	June 12 – 14	Seattle, WA USA	http:// to be announced e-mail: to be announced
17 <sup>th</sup> IFAC WORLD CONGRESS	July 6 – 11	Seoul Korea	http://www.ifac2008.org e-mail: Secretariat@ifac2008.org