



1987  
No. 5  
Oct.

# International Federation of Automatic Control

Secretariat: Schlossplatz 12, A-2361 Laxenburg, Austria — Phone (02236) 71 4 47, Telex 79248 ifac a

# Newsletter

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Impressum:

Medieninhaber und Herausgeber:  
International Federation of Automatic Control (IFAC), Genf  
Schlossplatz 12, A-2361 Laxenburg, Austria

Verlagsort und Redaktion:  
Dipl.-Ing. Gusztáv Hencsey  
Schlossplatz 12, A-2361 Laxenburg

Hersteller:  
Artur Schefczik & Sohn  
August-Reuss-Gasse 3, A-1130 Wien

Editor: Gusztáv Hencsey  
Layout: Margaret A. Gottfried  
published bimonthly

## 10th IFAC World Congress in Munich

A milestone in IFAC's 30 year history



A. Jaumann  
Bavarian Minister of Economy and Transport



K. Hahnzog,  
Mayor of the city of Munich

Opening Ceremony of the IFAC World Congress

The 10th World Congress of IFAC, marking the 30th anniversary of the Federation, was opened by F. Ernst, chairman of the National Organizing Committee, on July 27, 1987. In the further course of the opening ceremony, the delegates were welcomed by the Bavarian State Minister of Economy and Transport, A. Jaumann and the mayor of Munich, K. Hahnzog. After words of welcome extended by F. D. Althoff, chairman of the VDI/VDE-GMA, the German NMO of IFAC, the President of IFAC, Prof. M. Thoma addressed the audience, expressing his satisfaction that so many delegates had registered for this most important event in an IFAC triennium. The last speaker of the opening ceremony was Prof. R. Isermann, chairman of the International Program Committee, who informed the delegates about the preparation and final technical program of the Congress.

The number of submitted and invited papers reached an all-time peak of 1,150. Out of these, the International Program Committee had selected 583 for presentation in 11 parallel sessions. Following the successful structure of the previous Congress in Budapest, the 11 sessions included papers and discussion sessions covering 33 subject areas. The 16 discussion sessions gave the participants the opportunity of actively exchanging opinions, while the 7 case studies were devoted to practical experience stimulating great interest among the participants. To promote the connection between academic research and practical application, 5 industrial problem sessions were held and a special industrial problem meeting point was provided where participants from industry informally met scientists to discuss control- and related problems. The five plenary papers presented by distinguished scientists were

followed with particular interest. D. Ernst (FRG) and B. Philipson (UK) demonstrated the latest developments in industrial applications of automation; S. Narita (J) devoted his lecture to the ever more important role of information technology in systems control; the state of the art in theory and application of discontinuous control systems was presented by V. Utkin (SU); E. Gottzein (FRG) analysed the control challenges of spacecraft, stations and platforms while a survey on tele-robotics was given by T. B. Sheridan (USA). Additional information for the congress participants was provided by permanent video demonstrations on applied control techniques and the book exhibitions of Pergamon Books Ltd and the VDI-Verlag GmbH.

The 15 technical visits organized by our hosts gave the congress participants an excellent opportunity to visit the leading R&D laboratories and industrial plants of the Federal Republic of Germany to get acquainted with the latest developments in control applications and High Tech.

At the Closing Session of the Congress, L. Ljung, the incoming IFAC Vice-President and Technical Board Chairman stated:

"The first impression is rather breathtaking: So much to choose among and so little time. That may perhaps sound discouraging, but it really reflects the strength of the IFAC Congress: To encompass the whole broad field of automatic control and bring together the world's leading scientists, engineers and students of this field in a truly international event. I believe it is worth while to stress the social aspects of this. Among the many technical meetings that are arranged in our community by IFAC and by many other

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national and international organizations, only the IFAC Congress is a place where you can meet 'everyone', and where industrial and academic representatives can interact in a fruitful way over a broad spectrum of topics."

Boris Tamm, incoming IFAC President, in his closing speech, praised the good organization and warm hospitality of the Munich Congress and thanked for the hard and excellent work accomplished by H. Wiefels and his team.

Before and during the Congress week, meetings of the IFAC General Assembly, the Council and other IFAC bodies took place. More details on the technical program of the Congress, its evaluation as well as the meetings and the decisions taken on these occasions can be found in this and forthcoming issues of the IFAC Newsletter.

## New Personalities Come in to Serve IFAC with New Ideas

At the Closing Ceremony of the Congress, M. Thoma, IFAC President from 1984—1987, expressed his warmest thanks to all members of the Council, the IFAC Secretariat, the IFAC Boards and Committees, who had all supported him during the last three "unforgettable and rewarding years".

In his address M. Thoma stated:

"Ten outstanding personalities have served as IFAC presidents up to now. I consider it one of the greatest honours of my professional career that the chance was given to me to lead our truly international federation. Besides, the excellent consensus in basic professional matters, the pleasant human relations made it rather easy to carry the load."

M. Thoma handed the formal attributes of his office — gavel and seal — to his successor, B. Tamm and pointed out:

"I consider the three year rotation principle an excellent rule because new personalities come in to serve IFAC with new ideas. This is especially needed in our rapidly developing field. IFAC must be kept dynamic."

Taking over the presidency B. Tamm said:

"Over the past 3 years the first violin was played by our outgoing and Immediate Past President, Prof. Manfred Thoma, who not only succeeded in maintaining IFAC's high standard but also had new ideas. Our tradition has developed towards stimulating young scientists, excellent lecturers and education in our field of activity. Because of Prof. Thoma's outstanding contributions to our federation which were based on a broad professional and cultural background, IFAC is at present in a good technical, organizational and financial shape. IFAC is very lucky to have had Prof. Thoma as President for the last period."

At the end of the closing session a film of Tallinn, the venue of the 11th IFAC World Congress in 1990, was shown and everybody was invited to come to the Estonian capital.

# IFAC General Assembly

## New NMOs, New Officers

At its statutory General Assembly, held in Munich, FRG on July 27, 1987, the representatives of the National Member Organizations unanimously voted in favour of two organizations that had applied for IFAC membership:

The Korean Association of Automatic Control  
Seoul National University  
Dept. of Control and Instrumentation Engineering  
56-1 Shinrim-Dong, Kwanak-Ku, Seoul, Korea  
Kuwait Society of Engineers  
Strasse  
POB 4047 (Safat), Kuwait

Furthermore the General Assembly adopted some minor amendments to the IFAC Constitution and By-Laws.

A unanimous vote was also cast in favour of the new officers and Council members. The slate of candidates had been proposed by the Elections Committee for the 1987—1990 period. The following persons will hold positions in IFAC during the next triennium:

### COUNCIL

President  
President-Elect  
Vice-President (Technical Board)  
Vice-President (Executive Board)  
Immediate Past President  
Treasurer  
Ordinary Members

B. Tamm (SU)  
B. D. O. Anderson (AUS)  
L. Ljung (S)  
S. Kahne (USA)  
M. Thoma (D)  
M. Mansour (CH)  
H. Akashi (J)  
A. van Cauwenberghe (B)  
A. Fossard (F)  
G. Guardabassi (I)  
V. Kučera (CS)  
P. Larsen (DK)  
L. Lazarov (BG)  
Yong-Zai Lu (PRC)  
G. Hencsey (H)

### Secretary

### TECHNICAL BOARD

Chairman  
Vice-Chairmen

L. Ljung (S)  
R. Gellie (AUS)  
R. Isermann (D)  
A. H. Levis (USA)  
L. Martensson (S)

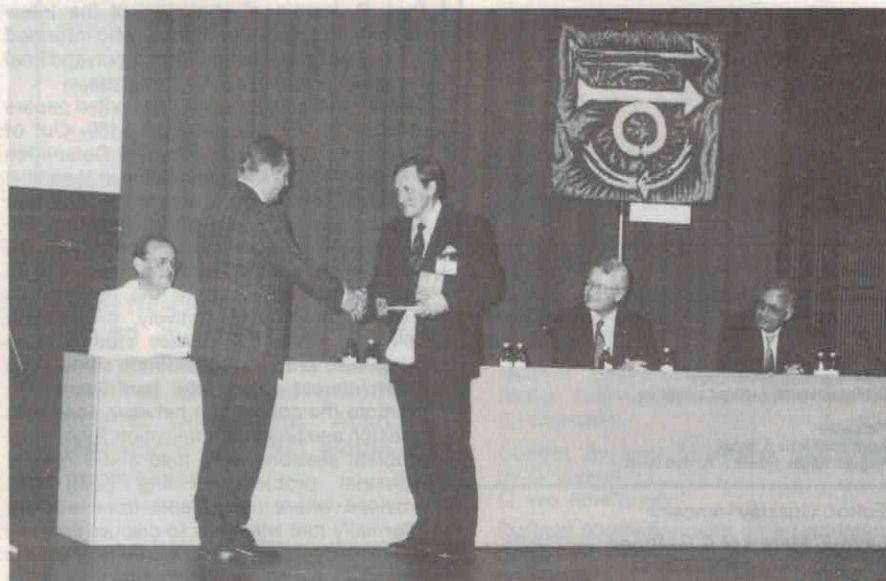
### Members

Chairmen of Technical Committees

### EXECUTIVE BOARD

Chairman  
ex officio (Immediate Past President)  
ex officio (Treasurer)  
ex officio (Secretary)  
ex officio (Chairman Policy Comm.)  
ex officio (Chairman Publ. Comm.)  
ex officio (Chairman Adm. & Fin. Comm.)

S. Kahne (USA)  
M. Thoma (D)  
M. Mansour (CH)  
G. Hencsey (H)  
J. D. N. van Wyk (ZA)  
J. Gertler (USA)  
B. D. O. Anderson (AUS)



# Presentation of IFAC Awards

## Professor K. J. Aström Awarded the Quazza Medal



In the opening ceremony of the 10th IFAC World Congress, the President of IFAC, M. Thoma presented the **Giorgio Quazza Medal** to Karl-Johann Aström. He is the third holder of this award, after Prof. J. F. Coales and I. Z. Tsytkin. K. J. Aström had been proposed by the Quazza Medal Selection Committee on the basis of his outstanding contributions to automatic control as a scientist and engineer. His activities in the fields of stochastic control, computer control and computer aided control engineering are well known throughout the control community. It is in particular the application of modern theoretical methods to practical and industrial problems that characterizes his work. Moreover he is recognized for his education leadership in control. The rare ability to combine in an excellent way theory and practice has, among other factors, been the reason for his several visiting appointments in the USA and in a number of European countries.

At present K. J. Aström is holder of the Chair of Automatic Control at the Lund Institute of Technology where he was responsible for building up the new department. His outstanding contributions have been recognized through a number of other awards as well. Among them are the Automatica Prize Paper Award in 1984 and the Rufus Oldenburger Medal of the American Society of Mechanical Engineers in 1986.

Professor Aström has served IFAC in a number of functions. He was Vice-Chairman of the Theory and the Advisory Committee and an ordinary Council member from 1981 — 1987.

## Automatica Prize Paper Award

As already at the 9th Congress, the Chairman of the Selection Committee, Professor Pieter Eykhoff, stressed how difficult it was to select the most prizable papers out of the great number of contributions of high standing. This had been the reason not only to select the prizewinners but also to give honorable citations to some papers.

The following papers were rated prizable based on the facts mentioned with each paper:

D. W. Clarke

Self-Tuning Control of Nonminimum-Phase Systems  
*Automatica*,  
vol. 20, no. 5, pp. 501—517 (1984)

*"This paper reports on very essential developments of adaptive systems. It is considered to be of high quality and innovation. It has deep relevance to the profession. The presentation and organization are excellent."*

J. C. Willems

From Time Series to Linear Systems  
part 1 — Finite Dimensional Linear Time Invariant Systems  
part 2 — Exact Modelling  
part 3— Approximate Modelling  
*Automatica*,  
vol. 22, no. 5, pp. 561—580 (1986)  
vol. 22, no. 6, pp. 675—694 (1986)  
vol. 23, no. 1, pp. 87—115 (1987)

*"These papers present a fresh theoretical view of systems modelling in a fundamental, precise and elegant way. The first part condenses everything that has been learned about systems theory in the last twenty years in a most beautiful way.*

*In the second and third part innovative ideas in identification are presented and worked out.*

*They are considered to be the best theoretical papers that have been published anywhere during the past three years."*

W. Leonhard

Microcomputer Control of High Dynamic Performance AC Drives — A Survey  
*Automatica*,  
vol. 22, no. 1, pp. 1—19 (1986)

*"This paper reports on real control engineering achievements in an important field. It has high relevance to the profession and society. It contains many new aspects. Its organization and presentation is excellent."*

O. L. R. Jacobs, H. J. McQuay, R. E. S. Bullingham, G. O. Sullivan, P. Lammer, M. P. Reasbeck

Modelling, Estimation and Control in the Relief of Post-Operative Pain  
*Automatica*,  
vol. 21, no. 4, pp. 349—360 (1985)

*"This paper is considered to be of great interest. It testifies the fact that tools,*

*developed for modelling and model-based control, might also work in the context of medical applications and thus, eventually, benefit everyone."*

The following papers received an honorable citation:

V. Peterka

Predictor-Based Self-Tuning Control  
*Automatica*,  
vol. 20, no. 1, pp. 39—50 (1984)

*"This is considered to be an essential step in the development of self-tuning control. Besides its present value it is also reminiscent of the pioneer function in adaptive control that the author developed in the late sixties."*

J. M. Jover

T. Kailath

A Parallel Architecture for Kalman Filter Measurement Update and Parameter Estimation  
*Automatica*,  
vol. 22, no. 1, pp. 43—57 (1986)

*"This paper is considered to have provided outstanding contributions to the fundamental issues in algorithms and architectures of Kalman filters for VSLI implementations. It enables the achievement of a magnitude of improvements in the real-time speed and performance of such a filter."*

## IFAC Congress Young Author Prize

At the closing ceremony of the Congress, the chairman of the selection committee, Professor S. Kahne, Vice-President of IFAC (Executive Board) announced the prize-winning paper and authors out of the 6 finalist papers which had been selected previously. The members of the selection committee had closely followed the presentation of each of the candidate papers. The prize-winning paper had been singled out during the Congress.

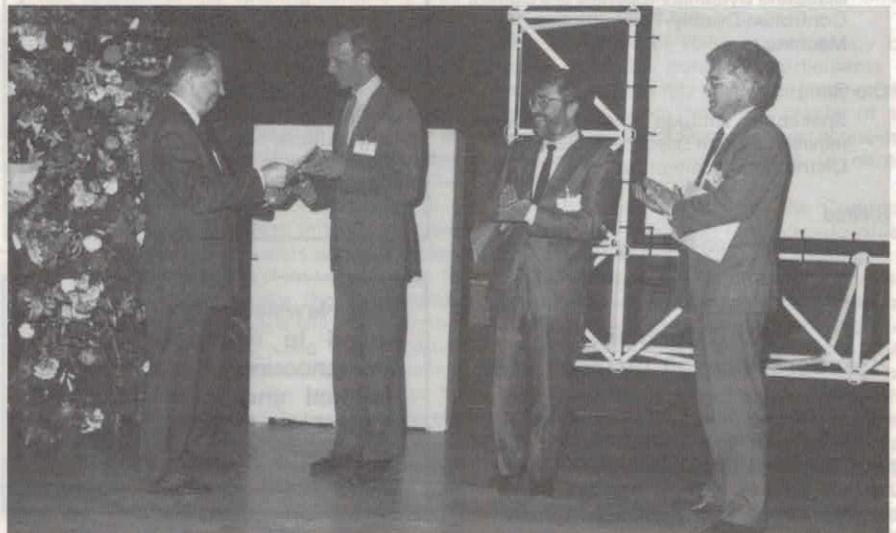
H. Kasahara

H. Fujii

M. Iwata

Parallel Processing of Robot Simulation  
Session 8. 2—5

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Presentation of the Automatica Prize Paper Award.  
From left to right: M. Thoma, O. Jacobs, J. C. Willems, D. W. Clarke.

## William E. Miller and Tibor Vamos Appointed Lifetime Advisors

**automatica**  
the Journal of IFAC the International  
Federation of Automatic Control



At the opening ceremony President M. Thoma appointed T. Vamos and W. E. Miller lifetime Advisors of IFAC and presented to them the "Advisor's Seal" of the Federation. Academician T. Vamos had been President of IFAC from 1981 — 1984. His activities in IFAC date back to 1959 since which time he has always held important positions in IFAC. Due to his personality and far-sightedness he not only

maintained the high standard of the Federation but added many new dimensions to it as well. Mr. Miller has been active in IFAC since the first World Congress in Moscow in 1960. Coming from industry his contributions to the Federation stressed the applications side and practical aspects of automatic control. He served the Federation as Vice-President from 1981 until 1987.

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The other finalists were:

R. Stelter

Two Stage Singular Perturbation Model Reduction for Gas Transmission Networks

J. P. Keller

D. Bonvin

Selection of Inputs for the Purpose of Model Reduction and Controller Design

A. M. Walczyna

Static and Dynamic Properties of a Current Controlled Doubly-Fed Induction Machine

Qiu Gang

Spacecraft Attitude Real-Time Determination System Based on Multiprocessor Distributed Architecture

S. Nold

Fault Detection in AC Drives by Process Parameter Estimation

### IFAC Congress Control Education Textbook Prize

Also at the Closing Ceremony the Control Education Textbook Prize was awarded for the first time to the following authors:

G. Goodwin

K. S. Sin

Adaptive Filtering, Prediction and Control  
Prentice Hall, 1984

We have just learned the sad news that Professor Ole A. Solheim passed away on August 19, 1987. His untimely death came just two weeks after he had been elected chairman of the IFAC TC on Terminology whose vice-chairman he had been previously. His contribution to IFAC will be greatly missed by his friends and colleagues in the IFAC community. He will be remembered as one who helped further the communication between and among control engineers speaking different languages in different parts of the world.

\*

On August 17, 1987, Mr. Maurice Remillieux, Secretary General of the Union of International Technical Associations, of which IFAC is a member, died suddenly and unexpectedly.

**This Newsletter may be reproduced in whole or in part. We encourage reprinting in national and local automatic control periodicals. Acknowledgement to IFAC would be appreciated.**

Photographs in this issue by:  
W. Weitzel

Papers from the Next Issue — Nov. 1987

#### Papers

Survey Paper

A Survey of the Control of Fed-Batch Fermentation Processes  
(A. Johnson)

Papers

Direct and Indirect Least Squares Methods in Continuous-Time Parameter Estimation  
(S. Vajda, P. Valko, K. R. Godfrey)

On the Optimal Tuning of a Robust Controller for Parabolic Distributed Parameter Systems  
(S. Pohjolainen)

Conditioning Technique, a General Anti-Windup and Bumpless Transfer Method  
(R. Hanus, M. Kinnaert, J.-L. Henrotte)

#### Brief Papers

Discrete Minimax Linear Quadratic Regulation of Continuous Time Systems  
(K. Kadiman, D. Williamson)

A Quasi-Newton Differential Dynamic Programming Algorithm for Discrete-Time Optimal Control  
(S. Sen, S. J. Yakowitz)

Sliding Mode Control in Infinite-Dimensional Systems  
(Ya. V. Orlov, V. I. Utkin)

A PI-Controller for Distributed Delay Systems  
(Y. A. Fiagbedzi, A. E. Pearson)

Discrete-Time Optimal Control of Systems with Unilateral Time-Delays  
(T. Fujinaka, M. Araki)

Constrained Pole-Placement Using Transformation and LQ-Design  
(B. Wittenmark, R. J. Evans, Y. C. Soh)

Measures of Overshoot, Speed of Response and Robustness  
(R. Doraiswami)

Unbiased Minimum-Variance Linear State Estimation in the Presence of Unknown Inputs  
(P. K. Kitanidis)

On Estimating the Order of an ARMA Process  
(J. J. Fuchs)

Stochastic Controllability of Linear Systems with Markovian Jumps  
(M. Mariton)

Effects of Mismatched Smith Controller on Stability in Systems with Time-Delay  
(K. Yamanaka, E. Shimemura)

#### Book Reviews

Control System Design: An Introduction to State Space Methods by B. Friedland  
(K. S. Hindi)

Modern Control Systems: A Manual of Design Methods by J. A. Borrie  
(L. Wozniak)

Control Systems Modelling and Analysis by G. Volland  
(J. van Amerongen)

Optimal Estimation with an Introduction to Stochastic Control Theory by F. L. Lewis  
(D. Kraft)



# FORTHCOMING EVENTS

(cont.)

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Title	1988	Place	Deadlines	Further Information
IFAC/IMEKO/IMACS Symposium Modelling and Control in Biomedical Systems	April 6—8	Venice Italy	—	Prof. C. Cobelli Istituto di Elettrotecnica e di Elettronica University of Padova, Via Gradenigo 6/a I-35131 Padova, Italy
IFAC/IFIP Symposium Software for Computer Control — SOCOCO '88	April 26—28	Johannesburg ZA	—	Prof. I. M. Macleod Dept. of Electrical Engineering, University of Witwatersrand 1 Jan Smuts Ave Johannesburg 2001, ZA
IFAC/IFIP Workshop (15th) Real Time Programming	May 25—27	Valencia Spain	*	Prof. J. A. de la Puente Dept. de Sistemas, Informaticos y Comput. Universidad Politecnico POB 22012 E-46071 Valencia, Spain
IFIP/IFAC Conference Hardware and Software for Real-Time Process Control	May 30— June 1	Warsaw Poland	*	Prof. J. Zalewski Institute of Atomic Energy PL-05-400 Otwock/Swierk, Poland
IUTAM/IFAC Symposium Dynamics of Controlled Mechanical Systems	May 30— June 3	Zurich CH	—	Prof. M. Mansour Institute of Automatics ETH Zurich CH-8092 Zurich, Switzerland
INRIA/IFAC (8th) Conference Analysis and Optimization of Systems	June 8—10	Antibes F	Nov. 1, 1987	Ms. Th. Bricheteau INRIA, B.P. 105 Domaine de Voluceau F-78153 Le Chesnay, France
IFAC Workshop Model Based Process Control	June 13—14	Atlanta, GA USA	*	Prof. Y. Arkun Dept. of Chemical Engrg., Georgia Institute of Techn. Atlanta, GA 30332, USA
IFAC/IFIP/IEA/IFORS Conference Analysis, Design and Evaluation of Man-Machine Systems (MMS '88)	June 14—16	Oulu SF	—	B. Wahlström Technical Research Centre of Finland Electrical Engineering Lab., Otakaari 7B SF-02150 Espoo, Finland
IFIP/IFAC Conference Software for Manufacturing PROLAMAT	June 14—17	Dresden GDR	—	Prof. D. Kochan Technische Universität Dresden Sektion Fertigungstechnik und Werkzeugmaschinen — PROLAMAT '88 Mommsenstrasse 13, DDR-8027 Dresden, GDR
IFAC Workshop Control Application of Nonlinear Programming	June 21—25	Tbilisi USSR	Dec. 15, 1987	Acad. V. A. Trapeznikov USSR National Committee of Automatic Control, Profsojuznaja ul. 65 Moscow GSP 312, USSR
IFAC/IMEKO/IMACS Symposium Distributed Intelligence Systems: Methodology and Applications	June 27— July 1	Varna BG	—	DIS '88 Symposium Information Centre "INFORMA" POB 26 BG-1592 Sofia, Bulgaria
IFAC Symposium Trends in Control and Measurement Education	July 11—13	Clyne Castle UK	—	Ms. Rosamund da Gama The Institute of Measurement and Control 87 Gower Street, London WC1E6AA, UK
IFAC Symposium Adaptive Control of Chemical Processes	August 17—19	Lyngby DK	—	Prof. M. Kümmel Denmark Technical University Institute for Kemiteknik, Bldg 229 DK-2800 Lyngby, Denmark
IFAC Workshop Robust Adaptive Control	August 22—24	Newcastle NSW, AUS	—	Prof. G. C. Goodwin Dept. of Electrical & Computer Engrg The University of Newcastle, N.S.W. 2308, Australia
4th IFAC Symposium Computer Aided Design in Control and Engineering Systems	August 23—25	Beijing PRC	—	Prof. Chen Zhen-Yu CADCS '88 Secretariat Application Committee of the Chinese Association of Automation P.O. Box 919, Beijing, PRC

\* deadline not yet known

# FORTHCOMING EVENTS (ctd.)

Title	1988	Place	Deadlines	Further Information
IFAC/IFORS Symposium Identification and System Parameter Estimation	August 27—31	Beijing PRC	—	Prof. Chen Han-Fu Institute of Systems Science Academia Sinica Beijing,, 10080, PRC
IFAC Symposium Power Systems: Modelling and Control Applications	Sept. 5—8	Brussels Belgium	—	J. Debelle, Vice President of IBRA Rue Ravenstein 3 B-1000 Brussels, Belgium
3rd Intl. Symposium Systems Analysis and Simulation	Sept. 12—16	Berlin GDR	*	Prof. Dr. A. Sydow ZKI der AdW der DDR Kurstrasse 33 DDR-1086 Berlin, GDR
IFAC Workshop Spacecraft Autonomy: Present and Future Capabilities	Sept. 13—15	Pasadena CA, USA	*	Mr. G. E. Cunningham Pathfinder Project, Jet Propulsion Lab. Mail Stop 79—21, 4800 Oak Grove Drive Pasadena, CA 91109, USA
IFAC Workshop (8th) Distributed Computer Control Systems — DCCS '88	Sept. 13—15	Vitznau CH	*	Prof. Bühler, SGA 16 Chemin de Bellerive CH-1007 Lausanne, Switzerland
SCI/IFAC Symposium Modelling and Control of Biotechnological Processes	Sept. 25—28	Cambridge UK	—	UKACC The Institute of Measurement and Control 87 Gower Street, London WC1E 6AA, UK
IFAC Workshop (2nd) Reliability, Availability and Maintainability of Industrial Instrumentation Systems	Sept. 28—30	Bruges B	Oct. 20, 1987	Dr. ir. L. Boullart Automatic Control Lab. University of Ghent Grotesteeweg Noord 2 B-9710 Ghent, Belgium
IFAC/IMACS/IFIP Symposium Robot Control SYROCO '88	October 5—7	Karlsruhe FRG	Nov. 30, 1987	Dr. G. Hirzinger DFVLR Oberpfaffenhofen D-8031 Wessling/Oberbayern, FRG
4th IFAC Symposium Systems Analysis Applied to Management of Water Resources	Oct. 11—13	Rabat Morocco	*	Prof. M. Najim, AMADEIA c/o Laboratoire Electronique Faculté des Sciences BP 1014, Rabat, Morocco
IFAC/IFIP Symposium Safety of Computer Control Systems — SAFECOMP '88	Nov. 9—11	Fulda FRG	Dec. 15, 1987	D. I. H. Wiefels VDI/VDE-GMA, Graf-Recke Str. 84 P.O. Box 1139 D-4000 Düsseldorf 1, FRG
Title	1989	Place	Deadlines	Further Information
IFAC Symposium Adaptive Control and Signal Processing	April 19—21	Glasgow UK	Nov. 16, 1987	Ms. Rosamund da Gama The Institute of Measurement and Control 87 Gower Street, London WC1E6AA, UK
IFAC/IMACS/IFIP Symposium (5th) Control of Distributed Parameter Systems	June 26—29	Perpignan France	*	A. El Jai Lab. d'Automatique IMP du CNRS Univ. de Perpignan, 50 Avenue de Villeneuve, F-66000 Perpignan, France
IFAC/IFORS/(IMACS Symposium Large Scale Systems: Theory and Applications	August 28—31	Berlin GDR	*	Prof. H. Fuchs Academy of Sciences of the GDR Kurstrasse 33, DDR-1086 Berlin, GDR
IFAC Symposium Automation in Mining, Mineral and Metal Processing	Sept. 4—8	Buenos Aires Argentina	*	Prof. J. Paiuk c/o AADECA, Venezuela 634 9° P. Off 39 1095 Buenos Aires, Argentina
IFAC/IFIP/IEA/IFORS Conference Analysis, Design and Evaluation of Man-Machine Systems (MMS '89)	Sept. 12—14	Xian PRC	*	Prof. Wang Ying Luo Xian Jiaotong University Xian, Shaanxi, PRC
Title	1990	Place	Deadlines	Further Information
XI IFAC WORLD CONGRESS	August 13—17	Tallinn USSR	January, 1989	Institute of Cybernetics Akadeemia tee 21 200108 Tallinn, USSR

\* deadline not yet known