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# Bulletin



*des Schweizerischen Elektrotechnischen Vereins  
de l'Association Suisse des Electriciens*

*des Verbandes Schweizerischer Elektrizitätswerke  
de l'Union des Centrales Suisses d'Electricité*

**Seite 169: SEV-Tagung: Sensoren – Grundlage  
der Automatisierung von morgen**

**Page 169: Journée de l'ASE: Les capteurs – base  
de l'automatique de demain**

**3/1983**

**Elektrotechnik – Electrotechnique:  
Energietechnik  
Technique de l'énergie**

**Versorgungssicherheit im Elektrizitätsnetz  
La sécurité d'approvisionnement électrique**

1.1.1983



## Gummi Maag nennt die Zukunft beim neuen Namen: Maag Technic.

Nach 78 Jahren Gummi Maag ist es an der Zeit, auch mit dem Namen auszudrücken, was wir in Wirklichkeit schon längst sind:

Ein technisches Handels- und Dienstleistungsunternehmen mit verschiedenen Bereichen, mit eigenen Werkstätten und kompetenten Fachspezialisten für die Erarbeitung auch komplizierter Problemlösungen interdisziplinären Charakters. Gummi und Kunststoff bleiben zwar unbestritten unsere Stärke, aber das Angebot reicht weit darüber hinaus, in alle technischen und industriellen Sparten hinein.

Wünschen Sie mehr Informationen: wir haben diesem Anlass eine Sonder-Broschüre gewidmet, die wir Ihnen gerne zusenden.

Gummi Maag. Die Zukunft hat begonnen. Maag Technic.



Gummi Kunststoffe Dichtungstechnik  
Antriebstechnik Ölhydraulik Pneumatik  
Zentralschmierung Arbeitsschutz

Maag Technic AG, Sonntalstrasse 8, CH-8600 Dübendorf 1, (01) 821 31 31 – Ecublens – Bern-Wabern – Basel – St. Gallen-Neudorf

# EMC Symposium & Exhibition, Zurich 1983 March 8-10

## TECHNICAL PROGRAM

### TUESDAY, MARCH 8

#### Environment TUm

Chairman: Prof. Dr. H. Kikuchi

- A1 W. Moron, Z. Rymarowicz, R. Struzak, *Institute of Telecommunications, Wroclaw, Poland: Results of MF composite radio noise survey in Poland.*
- A2 K. Bullough, A. Cotterill, *University of Sheffield, Sheffield, England: Ariel 4 observations of power-line harmonic radiation over North America and its effect on the magnetosphere.*
- A3 H. Kikuchi, *Nihon University, Tokyo, Japan: Charge neutralization problem for a space shuttle.*
- A4 J.-S. Chang, *McMaster University, Hamilton; W. Chisholm, Ontario Hydro Research; G. Stamoulis, W. Janischewsky, University of Toronto, Toronto, Canada: Impact of lightning beams on a tall structure.*

#### Interference models TUm

Chairman: Dr. A. D. Spaulding

- B1 D. Middleton, *New York, NY: Threshold detection in non-Gaussian interference environments: Exposition and interpretation of new results for EMC applications.*
- B2 V. A. Epanetchnikov, L. T. Remizov, *USSR Academy of Sciences, Moscow, USSR: Probability distribution of time intervals between pulses of VLF atmospheric noise.*
- B3 G. H. Koepke, M. T. Ma, *National Bureau of Standards, Boulder, CO: A new method for determining the emission characteristics of an unknown interference source.*
- B4 J. J. Pawelec, *Communication Research Institute, Warszawa, Poland: The criteria and metrics of compatibility in radio signals and systems.*

#### Propagation and wave coupling TUm

Chairman: Prof. Dr. F. E. Gardiol

- C1 J. Perini, *Syracuse University, Syracuse, NY: Determination of the angle of arrival, amplitude and phase of multipath reflections.*
- C2 T. C. Tong, A. Sankar, *TRW, Redondo Beach, CA: Scattering by a conducting tube of finite length.*
- C3 J. P. Plumey, D. J. Robertou, J. M. Fontaine, *Universite de Clermont II, Aubiere; P. Kouteynikoff, Electricite de France, Clamart, France: High frequency harmonic input impedance of an antenna embedded in a conducting half-space.*
- C4 W. Blumer, *Research Institute for Protective Construction, Zurich; M. Ianovici, Federal Institute of Technology, Lausanne, Switzerland: Calculation of the propagation constant of buried insulated conductors.*

#### Nuclear EMP TUa

Invited chairman: Dr. C. Baum

- D1 I. L. Gallon, *Atomic Weapons Research Establishment, Aldermaston, England: On the measurement of soil permittivity.*
- D2 M. Sirel, *Les Cables de Lyon, Paris, France: Theoretical and experimental study of EMP propagation under the ground.*
- D3 G. D. Sower, A. J. Bonham, G. D. Kahn, J. R. Pressley, *EG&G WASC, Inc., Albuquerque, NM: Instrumentation for EMP measurements.*
- D4 F. M. Tesche, D. B. Phuoc, *LuTech, Inc., Berkeley, CA: Techniques for the automatic surveillance of the electromagnetic hardness of electrical systems.*
- D5 J. L. ter Haseborg, *Hochschule der Bundeswehr Hamburg; H. Trinks, Technische Universitaet Hamburg-Harburg, Hamburg, GFR: Protection circuits for suppressing surge voltages with edge steepnesses up to 10 kV/ns.*
- D6 E. Kalasky, W. F. Crevier, *Mission Research Corp., Santa Barbara, CA: Improvements in the analytical treatment of source region EMP.*

#### Biological effects of exposure to RF radiation TUa

Invited chairman: J. C. Toler

- E1 J. Toler, *Georgia Institute of Technology; V. Popovic, Emory University School of Medicine, Atlanta, GA: Methods and approaches for studying biological effects of radiofrequency radiation: An overview.*

- E2 M. M. Weiss, *Bell Telephone Laboratories, Murray Hill, NJ: The rationale for radio frequency electromagnetic exposure standards.*
- E3 J. D. Grissett, *Naval Aerospace Medical Research Laboratory, Pensacola, FL: Integration of public policy and science in developing the rationale for exposure standards.*
- E4 J. C. Mitchell, *USAF School of Aerospace Medicine (RZP), Brooks AFB, TX: New guidelines for radiofrequency radiation safety.*
- E5 C. M. Weil, *US Environmental Protection Agency, Research Triangle Park, NC: Advances in experimental exposure methods and dosimetric techniques used in radiofrequency bioeffect studies.*
- E6 H. Cichon, *IARU Region I; H. Trzaska, Technical University of Wroclaw, Wroclaw, Poland: Electromagnetic radiation hazards and the amateur radio service.*

### WEDNESDAY, MARCH 9

#### F. Power electronics TUa

Invited chairman: A. Kloss

- F1 R. Yacmini, *University of Aberdeen, Aberdeen, Scotland; A. Abu-Nasser, UMIST, Manchester, England: Over-voltages caused by inrush current in HVDC schemes.*
- F2 L. Inzoli, *Honeywell I.S., Milano, Italy: EMI transient susceptibility of DC power distribution networks: Prediction analysis in time or frequency domain.*
- F3 B. Draxler, *Hochschule der Bundeswehr Muenchen, Neubiberg, GFR: Harmonics of power converters in dynamic operation mode.*
- F4 F. C. Zach, B. Demattio, *University of Technology, Wien, Austria: Pulse-time modulated converters for minimum harmonic content and ideal power factor.*
- F5 R. P. Stratford, *General Electric Company, Schenectady, NY: AC - harmonic filters for power electronics.*
- F6 I. V. Zhezhelenko, V. N. Nikiforova, *Allunion Research Institute of Energetics, Moscow, USSR: Electromagnetic compatibility of electrical equipment in power and industrial supply systems.*
- F7 H. Sauvain, *EMC Fribourg, Fribourg, Switzerland: EMI control in power distribution.*

#### G. NEMP simulation WEm

Invited chairman: Dr. F. M. Tesche

- G1 C. E. Baum, *Air Force Weapons Laboratory, Kirtland AFB, NM: Review of hybrid and equivalent-electric-dipole EMP simulators.*
- G2 D. V. Giri, *LuTech, Inc., Berkeley, CA: Review of guided wave EMP simulators.*
- G3 I. D. Smith, *Pulse Sciences, Inc., Oakland, CA: The pulse power technology of high altitude EMP simulators.*
- G4 I. L. Gallon, *Atomic Weapons Research Establishment, Aldermaston, England: HEMP - the UK EMP generator of horizontally polarized waves.*
- G5 N. Berkane, Ch. Pichot, B. Besnault, G. Peronnet, *CNRS - ESE, Gif-sur-Yvette, France: Target interactions and influence of grounding electrodes in an EMP simulator.*
- G6 A. Bushnell, W. Caton, F. Graham, D. Husovsky, A. Ramrus, J. Harrison, R. White, Y. G. Chen, *Maxwell Laboratories, Inc., San Diego, CA: High voltage EMP pulse generator and transportable SREMP simulation pulser.*
- G7 B. Braendli, W. Jenni, J. Bertuchoz, *Swiss Armament Technology and Procurement Group, Spiez, Switzerland: High current pulse cable testing system.*

#### H. Immunity WEm

Chairman: A. de Jong

- H1 R. Armantrout, *Hewlett-Packard Company, Santa Rosa, CA: Interference in FM broadcast and television due to direct-sequence spread spectrum signals.*
- H2 J. Menez, B. Djebbari, A. Zeddani, A. Caron, *CNET, Lannion, France: Electromagnetic field coupling to telecommunication networks.*
- H3 A. Sowa, *Technical University of Bialystok, Bialystok, Poland: Electromagnetic disturbances caused by lightning in communication and control equipments.*
- H4 D. Stipanovic, *University of Split, Split, Yugoslavia: The EMC figure of merit in the prediction of receptor compatibility.*
- H5 M. Porteanu, *Bucuresti, Romania: A logical structure with high noise immunity.*
- H6 G. K. Boronichev, *Leningrad branch of the Radio Research Institute, Leningrad, USSR: Effect of interference sources on receptors.*
- H7 A. S. Nemirovsky, I. L. Papernov, *Radio Research Institute, Moscow, USSR: Studies of pulse interference effects on a FM multichannel troposcatter communication system.*

#### I. Suppression techniques WEm

Chairman: Dr. A. Whitehouse

- I1 T. Muellenheim, *Vacuumschmelze GmbH, Hanau, GFR: The HF properties of RFI suppression chokes with soft magnetic tape-wound cores as compared with ferrite cores.*
- I2 T. G. Dalby, *Boeing Company, Seattle, WA: Linear antenna near-field decoupling using a radial transmission line.*
- I3 J. J. Max, A. V. Shah, *University of Neuchatel, Neuchatel, Switzerland: Distributed lowpass filters for EMI filtering.*
- I4 M. A. Bykhovsky, V. V. Timofeev, *Radio Research Institute, Moscow, USSR: Improvement of electromagnetic compatibility by using interference cancellers.*
- I5 T. Takagi, *Tohoku University, Sendai, Japan: Theoretical and experimental study of switching and ignition interference in motor vehicles.*
- I6 T. V. Ivanova, *Leningrad branch of the Radio Research Institute, Leningrad, USSR: Control of interference produced by motor vehicles in road traffic.*
- I7 V. E. Maysodov, *Institute of Chemistry and Technology, Ivanovo, USSR: EMC improvement by power transmission using a magnetic frequency divider.*

#### J. Non-homogeneous fields WEa

Invited chairman: J. F. Fischer

- J1 J. F. Fischer, *Xerox Corporation, El Segundo, CA: Correlation of surface currents to radiated fields.*
- J2 T. Fujiwara, H. Ujii, *Tohoku Institute of Technology, R. Sato, Tohoku University, Sendai, Japan: Sensing of noise current distribution on the automobile body surface.*
- J3 R. Bersier, B. Szentkuti, *Swiss PTT, Berne, Switzerland: Rationale and new experimental evidence on the adequacy of conducted instead of radiated susceptibility tests.*
- J4 M. Kanda, F. X. Ries, L. D. Driver, *National Bureau of Standards, Boulder, CO: A simultaneous electric and magnetic field sensor for near-field electromagnetic field measurements.*
- J5 T. W. Wiecekowsky, *Technical University of Wroclaw, Wroclaw, Poland: Loop antenna near a boundary plane.*
- J6 M. J. Coenen, A. Jongepier, *Philips Research Laboratories, Eindhoven, Netherlands: Active broadband antennas in the 10 kHz - 30 MHz range.*
- J7 R. F. German, *IBM Corporation, Boulder, CO: Use of a monopole antenna for EMI measurements.*

#### K. Shielding and grounding WEa

Chairman: G. A. Jackson

- K1 D. E. Davenport, *Tracor MBAI, San Ramon, CA: Metallo-plexics for EMI shielding.*
- K2 H. W. Armstrong, *Graham Magnetics Inc., North Richland Hills, TX: Predicting the long-term effects of environmental stress on the shielding effectiveness of conductive coatings.*
- K3 I. P. MacDiarmid, C. P. Loller, D. N. Walton, *British Aerospace Warton, Preston, England: An investigation into the screening performance of aircraft access panels and doors.*
- K4 J. C. Alliot, P. Levesque, R. Hoarau, *ONERA, Chatillon, France: Electromagnetic coupling through aircraft structure during direct lightning flashes.*
- K5 W. Nitsche, *BVA-ETI, Wien, Austria: Shielding effectiveness of casings for interference fields caused by lightning strokes.*
- K6 B. Demoulin, P. Duvinaige, P. Cornic, P. Degauque, *Lille University, Villeneuve d'Ascq, France: Penetration through an interruption of the shield of a coaxial cable.*
- K7 J. W. E. Jones, *Portsmouth Polytechnic, Portsmouth, England: The conceptual problem of ground planes.*

#### L. EMC standards WEa

Invited chairman: R. B. Schulz

- L1 A. C. D. Whitehouse, *Home Office, London, England: The compatibility of standards.*
- L2 R. B. Schulz, *ITT Research Institute, Annapolis, MD: A procedure for estimating the risk of interference.*
- L3 E. L. Bronaugh, *Electro-Metrics, Amsterdam, NY: Forthcoming American national standards: New documents and revisions to old documents.*
- L4 M. N. Yazar, *Transport Canada, Ottawa, Canada: New directions for EMC standards.*
- L5 A. de Jong, *Dr. Neher Laboratories, Leidschendam; P. Groenvelde, Philips Concern Standardization Department, Eindhoven, Netherlands: EMC standards and their application in European countries.*
- L6 E. Nano, *Politecnico di Torino; M. Borsero, IENGF, Torino, Italy: Some considerations about interference voltage measurements and relevant limits.*
- L7 R. G. Struzak, *Institute of Telecommunications, Wroclaw, Poland: ISM RF radiation problem.*

## THURSDAY, MARCH 10

### M. Transmission line coupling THUm

Invited chairman: Prof. Dr. C. R. Paul

- M1 C. R. Paul, *University of Kentucky, Lexington, KY: Coupling to transmission lines: An overview.*  
 M2 E. F. Vance, W. Graf, J. Hamm, *SRI International, Menlo Park, CA: The effect of terminations on coupling to wires and pairs.*  
 M3 H. J. Price, *Mission Research Corporation, Albuquerque, NM: Electromagnetic coupling to wires over imperfectly conducting grounds.*  
 M4 K. H. Gonschorek, *Siemens AG, Erlangen, GFR: Application of computers for the determination of magnetic and electromagnetic coupling.*  
 M5 F. M. Tesche, T. K. Liu, *LuTech, Inc., Berkeley, CA: Excitation of a shielded multiconductor transmission line.*  
 M6 A. R. Martin, *Raychem Corporation, Menlo Park, CA: The shielding effectiveness of long cables, III: Maximum leakage.*  
 M7 C. R. Paul, D. Koopman, *University of Kentucky, Lexington, KY: Sensitivity of coupling to balanced, twisted-pair lines to line twist.*

### N. Measurements THUm

Chairman: Prof. Dr. C. Egidi

- N1 B. Szentkuti, *Swiss PTT, Berne, Switzerland; A. Feurala, P&T Tele Labs, Helsinki, Finland: New views on the absorbing clamp in the testing of cable screening effectiveness.*  
 N2 M. L. Crawford, *National Bureau of Standards, Boulder, CO: Evaluation and calibration of a mode tuned reverberation chamber for EMC immunity measurements.*  
 N3 G. d'Ambrosio, G. Ferrara, *Universita di Napoli, Italy: Experimental analysis of multimode time-varying enclosures.*  
 N4 E. Grudzinski, H. Trzaska, *Technical University of Wroclaw, Wroclaw, Poland: The TEM-cell in EMC investigations.*  
 N5 M. Mardiguian, R. K. Keenan, D. R. J. White, *Don White Consultants, Gainesville, VA: Electrostatic discharge diagnostics and control.*  
 N6 W. W. Schroeder, H. Yntema, *CSIR, Pretoria, RSA: Spike generator - peak voltage detector: A test system.*  
 N7 D. R. J. White, R. K. Keenan, M. Mardiguian, *Don White Consultants, Gainesville, VA: Pulse spectrum density errors and mitigation.*

### O. EMC computer programs THUm

Invited chairman: Prof. Dr. J. Perini

- O1 C. R. Paul, *University of Kentucky, Lexington, KY: SHIELD - a digital computer program for the prediction of crosstalk to shielded cables.*  
 O2 G. Solbiati, *SIRTI SpA, Milano, Italy: A comprehensive program for EMC evaluation on pipelines.*  
 O3 G. S. Pettit, *Martin Marietta Aerospace, Denver, CO: A computer code for magnetics analysis of spacecraft.*  
 O4 S. R. Mishra, T. J. F. Paviasek, *McGill University, Montreal, Canada: A computational technique for the design of absorber-lined chambers.*  
 O5 M. Najmoudinne, J.-F. Plumeu, J. Fontaine, *University of Clermont II, Aubiere, France: Computing code for the determination of perturbations appearing on communication cables placed near power cables subjected to high transient regimes.*  
 O6 M. Netzer, E. Lupu, M. Miller, I. Maor, *RAFAEL - Armament Development Authority, Haifa, Israel: Analysis of EM radiation hazards to ordnance and personnel by computerized simulation.*  
 O7 S. J. Kubina, *Concordia University, Montreal; P. Bhartia, Defence Research Establishment, Ottawa, Canada: Features and potential of the AAPG computer code.*

### P. EMI in microelectronics THUA

Invited chairman: Prof. Dr. J. J. Whalen

- P1 J. J. Whalen, *State University of New York at Buffalo, Amherst, NY: EMI in microelectronics - an update.*  
 P2 J. G. Tront, D. W. Royster, *Virginia Polytechnic Institute and State University, Blacksburg, VA: RFI effects in MOSFET integrated circuits.*  
 P3 S. Caniggia, *ITALTEL S.I.T., Milano, Italy: EMC design of digital systems using macromodelling procedures for integrated circuits and their interconnections.*  
 P4 J. J. Goedbloed, K. Riemens, *Philips Research Laboratories; A. J. Stenstra, Philips Advanced Audio Projects Laboratory, Eindhoven, Netherlands: Increasing the RFI immunity of amplifiers with negative feedback.*  
 P5 Y.-H. Sutu, J. J. Whalen, *State University of New York at Buffalo, Amherst, NY: A comparison of RFI in operational amplifiers.*

### Q. EMC analysis and design THUA

Chairman: Prof. Dr. R. Zwicky

- Q1 J. G. Olin, D. D. Bailey, F. D. Eesenwein, *Packard Electric, Warren, OH: Radiated emissions from transmission lines in digital control systems.*  
 Q2 H. Curtins, A. V. Shah, *University of Neuchatel, Neuchatel, Switzerland: Crosstalk in digital systems.*  
 Q3 S. T. Li, J. C. Logan, J. W. Rockway, *Naval Ocean Systems Center, San Diego, CA: Shipboard antenna system design.*

- Q4 G. K. Chan, *Department of Communications, Ottawa, Canada: A practical approach to determine the culling mechanism in electromagnetic interference analysis models.*  
 Q5 L. Katz, *IIT Research Institute, Annapolis, MD: Environment compatibility model for search radar deployment.*  
 Q6 F. D. Martzloff, *General Electric Company, Schenectady, NY: The effect of repetitive surges on transient overcurrent and overvoltage protective devices.*  
 Q7 U. Herrmann, *VEB Kombinat Elektroenergieanlagebau, Berlin, GDR: Electromagnetic compatibility of measuring and control circuits in high-power test laboratories.*

### R. Spectrum management THUA

Chairman: Prof. Dr. R. Struzak

- R1 Z. Rymarowicz, E. Mazur, *Institute of Telecommunications, Wroclaw, Poland: Frequency and power assignment to a transmitter network.*  
 R2 V. A. Leonov, K. B. Sookhomlin, V. N. Nikitin, R. V. Shamshin, *Leningrad branch of the Radio Research Institute, Leningrad, USSR: Solution of EMC problems in a local radio-relay communications network with a ring structure.*  
 R3 M. G. Zhidkov, B. A. Klyzhenko, O. L. Lukianova, V. F. Menchik, *Kuybyshev branch of the Radio Research Institute, Kuybyshev, USSR: Effective frequency spectrum utilization using an algorithm for automatic channel allocation in land mobile service.*  
 R4 L. E. Varakin, *Allunion Correspondence Institute for Telecommunications, Moscow, USSR: Electromagnetic compatibility of cellular mobile communication systems with pseudo-noise signals.*

#### Explanation of symbols:

TUm, TUA ..... Tuesday morning/afternoon  
 WEM, WEA ..... Wednesday morning/afternoon  
 THUm, THUA ..... Thursday morning/afternoon

## WORKSHOPS

#### Workshops Program Chairman:

Herb K. Mertel, *EMACO Consultants, San Diego, CA*

#### W1. URSI commission E special workshop on lasting effects of transients on equipment performance (Monday, March 7, 14.00-16.00)

Organiser: Prof. Dr. S. Lundquist

Chairman: To be announced

Speakers: Prof. Dr. S. Lundquist, *University of Uppsala, Sweden*  
 Prof. Dr. F. L. Stumpers, *Eindhoven, Netherlands*  
 Prof. Dr. J. Wiesinger, *Hochschule der Bundeswehr, Muenchen, GFR*

#### Topics:

- Classification of natural and man-made transients
- Propagation of transient waves and fields
- Physics of interaction and classification of lasting effects
- Principles of protection against transients
- Practical implications and future developments

#### W2. Systems EMC (Monday, March 7, 16.15-18.15)

Chairman: D. N. Sward

This workshop explores the methodologies required for economical achievement of systems EMC. Ample time will be allowed for detailed discussion of the following presentations:

- K. S. Nordby, *IBM Corp., Endicott, NY: Achieving product EMC economically.*
- D. N. Sward, *Canadian Department of Communications, Ottawa, Canada: The development of an electromagnetic immunity testing system.*
- J. Shapira, *RAFAEL, Haifa, Israel: Observations on EMC methodology.*

#### W3. Design and test for RFI regulations of USA and CISPR (Tuesday, March 8; 14.00-17.00)

Chairman: H. K. Mertel

Speakers: L. A. Wall, *FCC, Washington, DC*  
 D. Hantulla, *Apple Computers, Cupertino, CA*  
 H. K. Mertel, *EMACO, San Diego, CA*  
 J. F. Fischer, *Xerox, El Segundo, CA*

#### Topics:

- The FCC Part 15 regulation with emphasis on computer products
- Comparison of FCC, CISPR and VDE limits
- Design guidelines to meet the RFI limits for microprocessor controlled equipments and larger systems
- RFI test methods
- Results and photographs of actual tests and test configurations

#### W4. EMP simulation

(Wednesday, March 9, 14.00-17.00)

Chairman: Dr. F. M. Tesche

Speakers: Dr. C. E. Baum, *AWFL, Albuquerque, NM*  
 C. Jillies, *EG&G, Albuquerque, NM*

#### Topics:

- Types of EMP simulation
- Data acquisition methods
- Data processing methods
- Errors in simulation
- Interpretation of simulated results
- Round table discussion with audience

#### W5. Predicting radiating emissions from computing devices and controls (Thursday, March 10, 14.00-17.00)

Chairman and speaker: D. R. J. White, *Don White Consultants, Gainesville, VA*

#### Topics:

- Radiations from chips printed circuit board traces and flat ribbon cables
- How to predict total radiation for VDE, FCC and CISPR compliance
- How to iterate trial designs with parameter selection to just comply
- Demonstration using interactive graphics microcomputer terminal

Note: Admission to the workshops is free for all fully registered participants. One-day ticket entitles the bearer to attend on the particular day only. For workshops W1 and W2 special tickets at Fr. 20.— will be made available to non-registered guests.

## TECHNICAL EXCURSIONS

#### Excursions organiser:

J. Ørum, *ETH Zurich*

Following program is planned:

A. a. Brief information on the Swiss Federal Institute of Technology.  
 b. Visit to the waterworks of Zurich: EMP protection of the water supply.

B1. Visit to Zellweger Uster, Hombrechtikon: EMC problems arising in some telecommunication products.

B2. Visit to Standard Telephon und Radio AG, Zurich: New technologies in communications.

Tour A is planned for Friday morning and includes a light lunch, in the afternoon either visit B1 or B2 may be chosen. All excursions are at no cost for fully registered participants.

#### Important:

Since the number of places is limited, please register in advance by checking the appropriate box on the Registration card at the right side of this page.

### PROVISIONAL LIST OF EXHIBITORS

(As per August 20, 1982)

AILTECH-EATON, GFR/USA  
 SCHAFFNER ELEKTRONIK, Switzerland  
 EMERSON & CUMING, Belgium  
 ROHDE & SCHWARZ, GFR  
 ALTOFLUX, France  
 TEXSCAN, GFR  
 BELLING & LEE, England  
 HIGH VOLTAGE TEST SYSTEMS, Switzerland  
 SIDETEL (SIDEN-TELEC), France  
 CHASE ELECTRIC, England  
 DON WHITE CONSULTANTS, USA  
 RFI SHIELDING, England  
 KONTRON, Switzerland  
 OMECON ELEKTRONIK - TECKNIT, GFR  
 PÖTSCHKE & CO, KG, GFR

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